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Disclaimer

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CONTENTS

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CONTENTS

Articles **Page**

Foreword

It is with immense pride and anticipation that I present to you the inaugural issue of the "Journal of the North Eastern Council (NEC)." After a significant hiatus of about a decade, this journal returns as a testament to the vibrant pulse and evolving narratives of our cherished region.

This issue marks a milestone in our journey, celebrating 50 years of the NEC's enduring legacy. Our first article reflects on this remarkable journey, exploring the iconic institutions and infrastructure that have shaped our region over half a century. It is a fitting tribute to the vision and perseverance that have guided the NEC through decades of transformation.

We embark next on a unique agro-biodiversity walk, a collective exploration that highlights the rich tapestry of natural treasures bestowed upon us. This exploration is not merely a journey through landscapes but an invitation to appreciate the intricate relationships between our environment and the diverse forms of life it nurtures.

Delving into specific regional topics, we turn our attention to the rice ecosystems of Nagaland. The focus here is on indigenous jhum rice varieties, renowned for their resilience—drought tolerance, photo-period insensitivity, disease and insect tolerance, and robust root systems. This article underscores the profound knowledge embedded in our traditional agricultural practices and the importance of preserving these time-honored varieties.

The journal also brings to light the often-overlooked traditional wild fruits, such as the Indian chestnut, which play a crucial role in local nutrition and health. These fruits, though less glamorous, provide vital sustenance and are integral to our culinary heritage.

In addressing significant health concerns, we confront the challenge of esophageal cancer—a pressing issue in North Eastern India. Through heightened awareness and understanding, we aim to combat this condition, recognizing the role of high tobacco and betel nut consumption as contributing factors.

Our exploration continues with a tribute to the vibrant cultural heritage of the Ao and Sumi Nagas, focusing on their ethnic games. These traditional sports are not just pastimes but vital cultural expressions that reflect the rich history and values of our communities.

We also examine the attitudes of tribal elementary education teachers towards inclusive education in the Ri Bhoi District. This study sheds light on the evolving perspectives and challenges in providing equitable education for all.

The transformative power of rural tourism is highlighted next, showcasing how villages such as Mawlynnong of Meghalaya and rural settlements are embracing this model. The impacts on the economy, land-use, socio-cultural, and environmental landscapes are profound and multifaceted, demonstrating the potential of tourism as a catalyst for sustainable development.

Urban agriculture, particularly oyster mushroom farming, is another focus area, illustrating the innovative ways in which economic activities can integrate into city life while fostering sustainability.

Our issue concludes with a poignant case study on Corporate Social Responsibility (CSR) funding, and a tribute to Mr P P Shrivastav, a stalwart of the NEC whose legacy continues to inspire.

As we unveil this issue, we invite you to engage with the diverse array of topics covered and to join us in celebrating the achievements, challenges, and aspirations that define our region. The "Journal of the North Eastern Council" is more than a publication—it is a reflection of our shared journey, our collective wisdom, and our commitment to a prosperous future.

With warm regards,

(Angshuman Dey)
Secretary, North Eastern Council

NEC:
Glorious 50 Years of Existence and its Amrit Kaal

Dipankar Borah

"If the western region of the country can develop, if other regions of the country can develop, I see no reason why the North East region of the country cannot develop. I am also convinced that India can move forward if all the regions develop including the North East region. The North East region is also very important to us for strategic reasons. And it is my conviction that we have to bring this region at par with the other developed regions of the country."

- Prime Minister Shri Narendra Modi while addressing the 65th Plenary Council Meeting, May 2016

Introduction:

As our Prime Minister Shri Narendra Modi termed the eight States of the region as 'Ashta Lakshmi' has seen its immense potentialities, cultural uniqueness and strength, full of natural resources etc. which is indeed great inspiration to grow more.

The role of NEC is changing over the decades from Advisory body to Nodal Agency to Regional Planning body etc. But, the primary goal remain same that is to accelerate the pace of socio-economic development of the region so that all the States of Northeast may enjoy growth parity with the rest of the country by focusing on connectivity, capacity building, resource and skill based industry, trade and tourism, harnessing cultural strengths and creativity with massive investments. To proper understanding the role of NEC at present and future development, we must know the history of NEC and its great achievements over the past decades in the Northeastern region.

History at a Glance:

North Eastern Council (NEC) was established by an Act of the Parliament in 1971 (Act no. 84 of 1971) and its formal inauguration on 7th November, 1972 at Shillong, Meghalaya by the then Prime Minister (late) Shrimati Indira Gandhi, marked the beginning of a new chapter of concerted and planned endeavor on the part of the North Eastern region consisting of the states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura. The national leaders in their wisdom, decided to reorganize the North Eastern region, and to constitute a regional body styled as North Eastern Council, to look after the common economic interests of the different States of the region. The constitution of the North Eastern Council in 1972, may therefore be described as one of the most significant events in the direction of planned and co-ordinated development of the north eastern region as a whole.

North Eastern Council (Amendment) Act, 2002 (68 of 2002) came into force with effect from 26th June, 2003 and the main features of the Act are:

I) Sikkim included in NEC
ii) President of India to nominate Chairman
iii) Three additional members are to be nominated by the President of India
iv) NEC to function as the Regional Planning Body for NER instead of Regional Advisory Body.

The first Chairman of NEC was Shri B.K. Nehru and the first Secretary of NEC was Shri D.K. Bhattacharjee. The first Plenary Meeting of NEC was held on the day of inauguration itself and the second plenary session was held on 22nd July, 1973.

Development across North Eastern region:

Since its inception, the council has made significant contributions to the cause of the socio-economic development of the North Eastern region in its capacity as an Advisory body and later as a Planning body. The NEC has always worked in close coordination with the State Governments and other implementing agencies for the success of development efforts undertaken by it. The NEC has worked towards the goal of development not only through State Government and NGOs but also through various Central Government organizations (like the BRO etc.) and its own associate organizations (like the RIPAN, the RIMS, LGBRIMH, NEPA, NEEPCO, NESAC, NERAMAC, the IFAD, NERCRMS and other projects) that cater to the needs of the NER as a whole. Till now, with the funding of NEC more than 11500 kms of Roads have been constructed and supported in the installation of more than 694 MW of power generating capacity and also constructed 2540 kms of transmission and distribution lines. NEC has also taken up the improvement of infrastructure of 5 major airports in the region – Guwahati, Dibrugarh, Jorhat, Imphal and Umroi, Meghalaya in collaboration with the Airport Authority of India. The council has also undertaken and completed Eleven Inter-State Bus Terminus (ISBT) projects and Four Inter-State Truck Terminus (ISTT) projects across different States to ease out interstate movement of people.

Data and Analysis:

Over the past five decades, NEC has been instrumental in setting in motion a new economic endeavor aimed at removing the basic handicaps that stood in the way of normal development and ushering in an era of new hope in this part of the country with full of great potentialities. Some of the landmark achievements and developments of NEC across the region during these years listed below.

Table 1: List of some iconic projects

Sl. No.	Name of the Remarkable Project/ Institution/ Establishment	Year of Established
1.	Regional Institute of Medical Sciences (RIMS), Imphal, Manipur	1972
2.	Dr B Borooah Cancer Institute (BBCI), Guwahati, Assam	1974
3.	North Eastern Electrical Power Corporation (NEEPCO), Shillong, Meghalaya	1976
4.	Regional College of Nursing, Guwahati, Assam	1977
5.	North Eastern Handicraft and Handlooms Development Corporation (NEHHDC), Guwahati, Assam	1977
6.	North Eastern Police Academy (NEPA), Shillong, Meghalaya	1978
7.	Regional Institute of Pharmaceuticals Science & Technology (RIPSAT), Agartala, Tripura	1979

8.	North Eastern Regional Agricultural Marketing Corporation (NERAMAC), Guwahati, Assam	1982
9.	Regional Dental College, Guwahati, Assam	1982
10.	North Eastern Regional Institute of Science & Technology (NERIST), Itanagar, Arunachal Pradesh	1984
11.	Koliabhomora Bridge, the second bridge over river Brahmaputra connecting Tezpur and Nagaon	1987
12.	North Eastern Regional Institute of Water and Land Management (NERIWALM), Tezpur, Assam	1989
13.	Lokapriya Gopinath Bordoloi Regional Institute of Mental Health (LGBRIMH), Tezpur, Assam	1999
14.	North Eastern Space Application Centre (NESAC), Umiam, Meghalaya	2000
15.	Cane and Bamboo Technology Centre (CBTC) currently known as North Eastern Cane and Bamboo Development Council (NECBDC), Byrnihat, Assam	2004
16.	Dr APJ Abdul Kalam Policy Research and Analysis, IIM Shillong, Meghalaya	2016
17.	Girl's Hostel for NER Students, Bangalore University, Bangalore	2019
18.	Kamjong to Kongkan Thana via Pilong Road, Manipur (37.3 km)	2022
19.	Advancing Northeast (ANE), a digital initiative and platform to act as a One stop solution focusing on career and livelihood of youths of the Northeast region	2022
20.	9th mile to Umsen via *Killing Pilangkata Road (29.8 km)*	2023

Moreover, apart from the above mentioned iconic projects or establishments, NEC is instrumental in bringing out many development initiatives/ community development projects which helps to grow in terms of development of North eastern region. Some of such projects, out of many listed below sector wise:

Table 2: List of some completed projects

Sl. No.	Sector	Name of the Project	Year of completion
1.	Agriculture & Allied	Cultivation of Large cardamom in various districts of Arunachal Pradesh	2019
2.	Agriculture & Allied	Development of Sericulture in Arunachal Pradesh	2019
3.	Agriculture & Allied	Agri-business centre with modern facilities including modest accommodation at Assam Agricultural University, Khanapara Campus, Assam	2020
4.	Agriculture & Allied	Development of Fruits and Vegetable wholesale Market at Pamohi (Garchuk) Kamrup, Phase-III, Assam	2019
5.	Agriculture & Allied	Improving livelihood benchmark of poor and ultra poor through Fishery Centric Growth and Employment Intervention in Nalbari district, Assam	2020
6.	Agriculture & Allied	Upgradation of Sericulture training institute at Titabor, Assam	2017
7.	Agriculture & Allied	Construction of farmers hostel for ICAR, Lamphelpat, Imphal West district, Manipur(ICAR)	2020
8.	Agriculture & Allied	Construction of Khashimla Women Market Complex near Naga Gate, Hungpung, Ukhrul district, Manipur	2022
9.	Agriculture & Allied	Construction of Sub-division level tribal market complex	2019
10.	Agriculture & Allied	Development of Paddy-cum-Pisciculture Scheme in 5 (five) Hill Districts, Manipur	2016
11.	Agriculture & Allied	Construction of U Tirot Sing Market Complex, Mairang, West Khasi Hill district, Meghalaya	2020
12.	Agriculture & Allied	Promotion of Organic plantation of Khasi Mandarin Orange in Meghalaya	2024
13.	Agriculture & Allied	Setting up of a Seed Testing Laboratory in Meghalaya	2016
14.	Agriculture & Allied	Bamboo development project in Mizoram	2023
15.	Agriculture & Allied	Cultivation of Aloe Vera in Chhanchhuhna Khawpui in Darlawan RD Block, Mizoram	2015
16.	Agriculture & Allied	Establishment of Integrated Horticulture Training Centre at Chite, Aizawl	2014
17.	Agriculture & Allied	Agri Development in cluster basis at Peren, Mokokchung and Mon districts, Nagaland	2019
18.	Agriculture & Allied	Bee Keeping and Honey Development in Nagaland (Phase I and Phase II)	2013 & 2017

19.	Agriculture & Allied	Construction of table fish production farm at Duilongua village, New Jalukie, Peren district, Nagaland	2020
20.	Agriculture & Allied	Development of Paddy cum Fish Culture, Nagaland	2018
21.	Agriculture & Allied	Establishment of Modern Dairy Cattle at SASRD, Medziphema Campus, Nagaland University	2020
22.	Agriculture & Allied	Rubber Plantation, Nagaland	2017
23.	Agriculture & Allied	Development of Commercial Floriculture in Sikkim	2019
24.	Agriculture & Allied	Farm Mechanisation, Sikkim	2016
25.	Agriculture & Allied	Promotion of intensive fish culture technology with Pabda for sustainable production and livelihood security of rural farmers, Tripura	2016
26.	Agriculture & Allied	Sericulture Training institute in Tripura	2015
27.	Agriculture & Allied	Strengthening of Exotic Pig Breeding Farm, Birchandra Manu, Tripura	2019
28.	Education	Construction of Double Storied School Building at Sagalee (Govt. Higher Secondary School), Arunachal Pradesh	2018
29.	Education	Multipurpose Community Hall at Dumporijo ADC HQ. Upper Subansari District, Arunachal Pradesh	2020
30.	Education	Setting up of the Central Instrumentation Facility of new CBCS Course at Dibrugarh Hanumanbax Surajmall Kanoi College, Dibrugarh	2023
31.	Education	Infrastructure Development of Omeo Kumar Das Institute of Social Chage and Development, Guwahati	2019
32.	Education	Construction of Girls Hostel Chaoyaima H.S School at Manipur	2020
33.	Education	Construction of Boys & Girls Hostel at St. Anthonys School, Muirei, Ukhrul Dist. Manipur	2019
34.	Education	Construction of Multipurpose cultural cum Indoor Hall for the Youth in the Hill area of Manipur at Purul, Senapati Dist, Manipur	2019
35.	Education	Construction of SC/ST Boys and Girls Hostel in respect of National Institute of Electronics and Information Technology (NIELIT), Imphal	2020

36.	Education	Construction of G4 building for Skill Development at Ramakrishna Mission Vivekananda Cultural Centre, Shillong	2019
37.	Education	Construction of Nongkharai Christian Secondary School Building at Umsohpieng village, West Khasi Hills Distirct, Meghalaya	2020
38.	Education	Introduction of Interactive Digital Classroom for Development of Science and Mathematics in 24 Schools (3 classroom each) in the State of Meghalaya	2017
39.	Education	Community development programme for Bru & Chakmas in Mamit District	2023
40.	Education	Construction of Cluster of Academic Blocks at Pachhunga University College, Aizawl	2023
41.	Education	Construction of Research Scholars Hostel for Boys & Girls at Mizoram University	2019
42.	Education	Community Development Programme Construction of Multi Utility Community Hall at Mao Community Centre, Kuda Village, Dimapur, Nagaland	2023
43.	Education	Construction of Govt. High School Auditorium/Multi-Utility Hall at Longsa, Nagaland	2017
44.	Education	Construction of Multipurpose Hall at Nagaland University, Medziphema, Nagaland	2020
45.	Education	Construction of Old Age Home at Lower Kamrang, Kitchu Dumra, South Sikkim	2019
46.	Education	Construction of Science Block at Kamrang Govt. Degree College at Namchi, South Sikkim	2020
47.	Education	Development of Archery complex at Lalthagchan and Indoor Gymnasium for Boxing, Taekwondo, Karate, Wushu at Gangtok, East Sikkim	2015
48.	Education	Construction of 100 seated capacity of mens hostel at Regional College of Physical Education at Panisagar, North Tripura	2020
49.	Education	Infrastructure Development of Kamalpur English Medium HS School Kamalpur Dhalai District, Tripura	2020
50.	Health	Construction of 50 bedded Hospital at Pistana, Lower Subansiri District	2014

51.	Health	Up-gradation of Mengio (Shakiang) PHC to 50 bedded Hospital, Papumpare District (Revised)	2012
52.	Health	Establishment of Community Ophthalmology and School of Optometry and Ophthalmic Asstt. Technology at Sri Sankaradeva Nethralaya, Guwahati	2012
53.	Health	Release of Grant-in-Aid (Plan/ Non-Recurring) to the Government of Assam for activities related to combating COVID-19 pandemic	2023
54.	Health	Procurement of Advanced Medical Devices and Equipment at Sky Hospital and Research Centre, Imphal, Manipur	2016
55.	Health	Strengthening of Dental Care in District Hospitals and CHCs in Manipur	2015
56.	Health	Establishment of 6 bedded ICUs each at Civil Hospital, Tura and Ganesh Das Hospital, Shillong, Meghalaya	2013
57.	Health	Support for Procurment of an M.R.I. (1.5 T) machine at Civil Hospital, Shillong, Meghalaya	2015
58.	Health	Up-gradation of Equipment Infrastructure and Development of District Hospitals, Meghalaya	2015
59.	Health	Bio-Medical Waste Management Incinerators System for District Hospital, Lawngtlai, Champhai, Mamit & Serchhip in Mizoram	2019
60.	Health	Construction of Main Building of School of Nursing, Synod Hospital, Durtlang, Mizoram	2020
61.	Health	Establishment of a 20 bedded CCU/ICU at Naga Hospital, Kohima, Nagaland	2009
62.	Health	Procurement of MRI Machine in the Faith Hospital at Dimapur, Nagaland	2019
63.	Health	Setting up of North East Regional Multi-disciplinary Paramedical Institute, Dimapur, Nagaland	2017
64.	Health	Construction of T.B. Hospitals each at Mangan, North District and Gyalshing, West District, Sikkim	2015
65.	Health	Strengthening of Radiology Departments at Mangan CHC, Singtam CHC and Namchi CHC, Sikkim	2014
66.	Health	Up-gradation of Cancer Hospital, Agartala, Tripura	2013

67.	Health	Release of Grant-in-Aid (Plan/ Non-Recurring) to the Government of Tripura for activities related to combating COVID-19 pandemic	2023
68.	Industries	Construction of Multipurpose Shopping Complex at Hapoli, Lower Subansiri District, Arunachal Pradesh	2019
69.	Industries	ntegrated Development of Community Sericulture Garden at Solungyar Village, by Govt. of Arunachal Pradesh	2015
70.	Industries	Regional Handloom & Handicrafts Marketing Complex by M/s ARTFED, Gopinath Bordoloi Road, Ambari, Guwahati	2008
71.	Industries	Setting up of the Handloom Trade Centre at Dibrugarh, Assam by the Directorate of Handloom and Textile, Government of Assam	2016
72.	Industries	Upgradation/Replacement of Machineries of the Spinning Unit at Tulsibari, Assam	2014
73.	Industries	Construction of Common Facility Centre in Hill Districts of Manipur for Processing of Agriculture and Horticulture Products	2017
74.	Industries	Development of Work Sheds/Factory Sheds at Industrial Estate, Bishnupur, Manipur	2018
75.	Industries	Establishment of New Industrial Estate (Construction of Worksheds) at T.M. Kasom, Ukhrul, Manipur	2020
76.	Industries	Construction of a Rural Market Complex at Sohiong Village in the East Khasi Hills District, Meghalaya	2019
77.	Industries	Upgradation, Improvement and Widening of roads within Industrial Estate at Umiam, Ri Bhoi District, Meghalaya	2020
78.	Industries	Construction of Approach Road and Internal Roads of Industrial Growth Centre at Luangmual, Aizawl, Mizoram	2019
79.	Industries	Construction of New Market Building at Dawrpui Veng, Aizawl	2018
80.	Industries	Livelihood generation for returned migrant workers due to pandemic outbreak COVID-19 in the state of Nagland	2023
81.	Industries	600 coffee pulping machines to be provided for processing/value addition to cofee growers	2023
82.	Industries	Production and Training Centre for Soft Toys at Gangtok, Sikkim	2014

83.	Industries	Setting up of a Heritage Handicrafts Museum at Namchi, South Sikkim	2017
84.	Industries	Enhancement of Capacity of the Tea Processing Factory at Brahmakunda Tea Estate, West Tripura	2013
85.	Industries	Livelihood Development Through a Pilot Bamboo Enterprise for Rehabilitation of Surrendered Militants by Tribal Welfare Department, Govt. of Tripura, Agartala	2008
86.	Information & Public Relations	Construction of Cultural-cum- Development Centre at Miao, Arunachal Pradesh	2019
87.	Information & Public Relations	Protection/Preservation & Infrastructure Development of Archaeological Museum & Monument, Malinithan, Arunachal Pradesh	2015
88.	Information & Public Relations	Audio Visual Hub of Jyoti, Chitraban Film Studio, Kamrup, Assam	2020
89.	Information & Public Relations	Construction of Regional Multi-Utility and Town Hall and Cultural Centre, Tinsukia, Assam	2018
90.	Information & Public Relations	North East-ASEAN Business Summit organised by Govt. of Manipur	2021
91.	Information & Public Relations	Don Bosco Community Information Centre, Mawlai, Shillong	2015
92.	Information & Public Relations	Construction of Cultural Centre-cum-Auditorium at Vaivakawn, Aizawl, Mizoram	2015
93.	Information & Public Relations	Construction of Lianchhiari Run (A multi-facility Centre)	2020
94.	Information & Public Relations	Establishment of Lai Cultural Centre-cum-Auditorium at Lawngtlai, Mizoram	2022
95.	Information & Public Relations	Abiogenesis Centre for Performing Arts & Culture at Dimapur, Nagaland	2020
96.	Information & Public Relations	4th North East Connectivity Summit, Kohima organised by Govt. of Nagaland	2021
97.	Information & Public Relations	Emerging North East from 25th to 27th October, 2017 organised by Govt. of Sikkim	2021
98.	Irrigation & Flood Control	Augmentation of Water Supply at Jairampur Township from Ngaphy Nallah, Changlang District, Arunachal	2022
99.	Irrigation & Flood Control	Construction of Water Supply at CO Dadam, Tirap District	2020
100.	Irrigation & Flood Control	Flood Control Works at Namsai in Arunachal Pradesh,Lohit dist	2017
101.	Irrigation & Flood Control	Anti-Erosion Measures to protect Ranipur and its adjoining area from the erosion of river Pekua, Kokrajhar dist	2015

102.	Irrigation & Flood Control	Controlling of Jiadhal river in Dhemaji district in Assam, Phase-I	2019
103.	Irrigation & Flood Control	Ram Enghee Minor Irrigation project, Karbi-anglong dist	2020
104.	Irrigation & Flood Control	Anti-erosion & Flood Control scheme on Imphal river on 9.60km U/S of Korengei bridge (RD0.00km) at Awang Sekmai, Imphal West District	2020
105.	Irrigation & Flood Control	Composite Water Supply Scheme at Oklong in Senapati District, Manipur	2018
106.	Irrigation & Flood Control	Construction of A/E scheme on Khuga river at Zoummunnuam Churachanpur district	2019
107.	Irrigation & Flood Control	Construction of embankment cum road including sluice gates and protection works on the left bank of river Galwang on the Mandagre to Salsella-Balachanda road at Haldibari (3.35 km), West Garo Hills District, Meghalaya	2020
108.	Irrigation & Flood Control	Creating necessary Infrastructure for Storage of water to meet the Emergency needs of the State capital(Meghalaya), East Khasi Hills Dist	2017
109.	Irrigation & Flood Control	Irrigation cum Management Works at Umtrew Umkta Village, Ri-Bhoi District, Meghalaya	2018
110.	Irrigation & Flood Control	Darlawn Water Supply Scheme (Augmen-tation) in Mizoram, Aizawl dist	2014
111.	Irrigation & Flood Control	Implementation of Sangau WSS (pumping) Ph.I, Lawngtlai dist	2013
112.	Irrigation & Flood Control	Integrated Nzu Valley Irrigation Project at Phenshunyu Village, Kohima District, Nagaland	2019
113.	Irrigation & Flood Control	Storm Water Drainage at Shamator Town, Tuensang District, Nagaland	2020
114.	Irrigation & Flood Control	Augmentation of Water Supply for Namthang Bazar from Paha Khola and Khop source in South Sikkim	2020
115.	Irrigation & Flood Control	Construction Of Water Supply at Majitar in South Sikkim	2016
116.	Power	Construction of 132KV D/C Transmission line from Hoz to Itanagar (20 Km) including 2x20 MVA, 132/33 KV Substation at Chimpu, Itanagar, Arunachal Pradesh	2012
117.	Power	Construction of Express 33kV line from Dirang to Jang in West Kameng and Tawang District, Arunachal Pradesh	2020

118.	Power	System improvement of power distribution network in Dambuk under Lower Dibang Valley District, Arunachal Pradesh	2019
119.	Power	132 KV S/C Trans. Line from Mariani to Nazira along with132/33 KV, 2 x25 MVA S/s at Nazira	2012
120.	Power	Construction of 132/33KV, 1x16MVA 1X25MVA, Umrangshu S/s , North Cachar Hills District	2013
121.	Power	Construction of 33/11kV, 2X5 MVA Sub-Station alongwith associated 33kV, 11kV & LT Feeders at Bishnupur Panchali under Dhemaji Electrical Division, APDCL, Dhemaji, Assam	2019
122.	Power	Installation of 132/33 KV Substation at Kongba	2008
123.	Power	Installation of 2X 20 MVA, 132 kV Sub-Station along with associated 132kV LILO lines & related works at Thoubal, Manipur	2019
124.	Power	Installation of 2X5 MVA, 33 KV Sub-Station along with the associated 33kV line & related works at Mao, Senapati District, Manipur	2017
125.	Power	Construction of 132 KV S/c Transmission line on D/C tower from Agia (Assam) to Nangalbibra (Megh), (110 KM)	2010
126.	Power	Installation of 220/132kV, 1x100 MVA Auto transformer at Agia (Assam) for Meghalya	2014
127.	Power	132 KV Central Sub-Station at Melriat	2008
128.	Power	Construction of 1X2.5 MVA, 33/11KV S/s at Buarpui & Saiphai with associated lines, Mizoram	2017
129.	Power	Construction of 33kV S/C on DC Tower from Aibawk substation to Sialsuk Substation with Associated Bays & 11kV Lines, Mizoram	2019
130.	Power	Construction of new 132kV substation for shifting 132kV Zuangtui substation with associated interlinking 132kV Lines, Aizawl, Mizoram	2015
131.	Power	Construction of 220/132/33kV Substation at Chiephobozou Block (Zhadima)(Part-II), Nagaland	2015
132.	Power	Construction of 33kV Transmission lines, 33/11kV Substation,11kV lines, 11/0.4kV Distribution substation and LT Lines in Kohima, Nagaland	2015

133.	Power	Construction of 2X500kW Ponglefo SHEP, Nagaland	2019
134.	Power	Construction of 11/11 KV switching sub-station including re-arrangement and drawing of 11 KV transmission line at Kongri alongwith modernization of Tashiding Bazar in West Sikkim, Sikkim	2018
135.	Power	Construction of 66kV S/C Transmission Line from 132/66kV Switchyard at Ravangla to Central University with 66/11kV, 2x5MVA substation at Yangang, South Sikkim	2015
136.	Power	System Improvement & modernization i/c Augmentation of Distribution system of Uttarey Bazaar, Dentam Bazaar in West Sikkim	2019
137.	Power	1X21 MW Baramura Unit-V Gas Based Power Project, Tripura	2009
138.	Power	Construction of 132kV S/C Transmission Line from 132kV Ambassa substation to Gandacherra Substation (47 Ckm), Tripura	2015
139.	Power	Construction of 2X10MVA 132/33 KV and 2X10 MVA, 33/11 KV Sub-Station including LILO at Bishramganj, Sepahijala District, Tripura	2017
140.	Science & Technology	Statewide Telemedicine Programme for Health care Delivery in Arunachal Pradesh	2008
141.	Science & Technology	Decision Support System(DSS) for sustainable urban development of five selected towns of Arunachal Pradesh using Remote Sensing and GIS Arunachal Pradesh	2017
142.	Science & Technology	Online connectivity of schools & process information management systems for Dept. of School Education, Govt. of A.P.	2013
143.	Science & Technology	Strengthening on Geo-Informatic Application for Rural Development (C-GARD) laboratory (NIRD), National Institute of Rural Development (NIRD&PR), Guwahati	2014
144.	Science & Technology	Seismic Vulnerability Assessment of Major Cities in North Eastern India (NEIST), Jorhat	2015
145.	Science & Technology	Setting up of 50 seats Digital Planetarium at Manipur Science Centre	2015
146.	Science & Technology	Disaster Management system of Manipur (MARSAC) Manipur Remote Sensing Application Centre Govt. of Manipur	2015

147.	Science & Technology	Establishment of NE RS & GIS Resource Network (NeSDR), North Eastern Space Application Centre (NESAC), Umiam, Shillong	2020
148.	Science & Technology	IT based science & technology education programme at 100 schools in Meghalaya	2013
149.	Science & Technology	IT Education Infrastructure at 100 Schools in 11 Districts of Meghalaya (Dept. of Information Technology, Govt. of Meghalaya)	2016
150.	Science & Technology	IT Education Programme for 150 Schools in Mizoram, Mizoram State e-Governance Society (MSeGS), Aizawl	2019
151.	Science & Technology	Establishment of Rural Information Kiosks in 300 villages in the state of Mizoram	2015
152.	Science & Technology	Building of IT Infrastructure and Modernization of Motor Vehicle Department, Nagaland, Motor Vehicle Dept. Govt. of Nagaland	2020
153.	Science & Technology	Construction of Fire Station, Central Workshop-cum-Garage, Water Reservoir and Fire Fighting Equipments and Appliance	2016
154.	Science & Technology	Nagaland State Spatial Data Infrastructure & Natural Hazard Zonation Mapping of Nagaland	2012
155.	Science & Technology	Regional and State Requirement of Fire & Emergency Services Phase Wise at Nagaland. Department of Fire & Emergency Services Govt. of Nagaland	2020
156.	Science & Technology	Computerisation of Food & Civil Supplies and Consumers Affairs Department	2018
157.	Science & Technology	Sikkim E-Education Infosys for Sikkim, Department of Education, Government of Sikkim, Gangtok	2012
158.	Science & Technology	Planning Resource Center-Open Data Center DPER & NECAD, Sikkim. Development Planning Economic Reforms & North Eastern Council Affairs (DPER & NECAD), Govt. of Sikkim	2019
159.	Science & Technology	Supply of computers & peripherals at Mohanpur H.S. School, West Tripura	2013
160.	Science & Technology	Installation of Intelligent Character Recognition System (ICR) at 2 Institutions of Tripura	2011

161.	Sports	Construction of Football stadium at Jairampur under Changlang District, Arunachal Pradesh	2020
162.	Sports	Construction of playground, rostrum and gallery at Kendriya Vidyalaya, Tezu, Arunachal Pradesh	2020
163.	Sports	Construction of Mini Stadium at Bihaguri, Sonitpur District	2017
164.	Sports	Construction of Mini Outdoor Stadium at Senapati Public Ground, Senapati District, Manipur	2023
165.	Sports	Construction of Multipurpose Indoor Stadium at Haotabi Lampak, Thoubal, Manipur	2020
166.	Sports	Construction of Sports Complex at Indira Gandhi National Tribal University- Regional Campus. (IGNTU)	2021
167.	Sports	Construction of infrastructure for integrated training of the youth and sports cum convention Hall, Lower Chandmari, West Garo Hills District, Tura	2018
168.	Sports	Construction of Football Ground at Saitsnad, Mawlangwir, SW Khasi Hills District, Meghalaya	2020
169.	Sports	Establishment of Multipurpose Indoor Hall at Sihphir, Mizoram	2020
170.	Sports	Construction of Youth Recreation Centre-cum- Amalgamated office Complex for Sports & Youth Services Department at New Secretariat Complex, Aizawl, Mizoram	2021
171.	Sports	Construction of Multipurpose Sports Complex at Aizawl West Joint YMA Field, Vaivakawn, Aizawl, Mizoram	2019
172.	Sports	Construction of Multipurpose Hall at MLA Hostel Kohima, Nagaland	2021
173.	Sports	Construction of Outdoor Stadium in Pughoboto Sub-Divisional Headquarter, Zunheboto District, Nagaland	2018
174.	Sports	Construction of Indoor Stadium Shooting Range and Procurement of equipment and appliances for Nagaland State Rifle Association	2021
175.	Tourism & Culture	Development of Wayside Amenities at Tago Putu, Yazali, Lower Subansiri District, Arunachal Pradesh	2021

176.	Tourism & Culture	Development of Adventure Tourism Centre and Camping Site at Baririjo, Upper Subansiri District, Arunachal Pradesh	2018
177.	Tourism & Culture	Development & Beautification of Thanghaphey Lakes in Tawang District	2020
178.	Tourism & Culture	The Buddhist Destination Centre at Sivasagar Buddha Vihar, Sivasagar District, Assam	2019
179.	Tourism & Culture	Tea Museum at Dibrugarh, Assam	2017
180.	Tourism & Culture	Construction of Circuit House Churachandpur, Churachandpur Town, Manipur	2015
181.	Tourism & Culture	Infrastructure Development of Tourist Destination at Shanthei Natural Park, Andro, Imphal East District, Manipur	2018
182.	Tourism & Culture	Rural Eco Tourism Circuit in Garo Hills (East Garo Hills, West Garo Hills and South West Garo Hills), Meghalaya	2020
183.	Tourism & Culture	Orchid Lake Resort Development, Umiam, Ri Bhoi District, Meghalaya	2016
184.	Tourism & Culture	Integrated Tourist Circuit, Serchhip, Mizoram	2023
185.	Tourism & Culture	Samthang Zo Phulpui Nature Park, Mizoram	2024
186.	Tourism & Culture	Development of trekking & base camp at Mt. Saramati, Thanamir Village, Kiphire District Nagaland	2019
187.	Tourism & Culture	Infrastructure Development for Pilgrimage Destination at Molungyimsen, Mokukchung District, Nagaland	2015
188.	Tourism & Culture	Construction of Approach Road and Security Fencing at IHM, Dimapur, Nagaland	2015
189.	Tourism & Culture	Development of Eco-Tourism at Golitar, Fambonglho Wildlife Sanctuary, Sikkim	2014
190.	Tourism & Culture	Upgradation and Beautification of Lachen Bazaar in North Sikkim	2020
191.	Tourism & Culture	Setting up of a Star Category Hotel at Agartala (Infrastructure Development of Tourism, Tripura)	2008
192.	Transport & Communication	Construction of Tezu Airport in Lohit District	2013
193.	Transport & Communication	Digboi-Pengiri-Bordumsa-Mahadevpur road	2009
194.	Transport & Communication	Seppa-Chyangtajo road	2009

195.	Transport & Communication	Tamen-Dollungmukh Road	2013
196.	Transport & Communication	Bhawanipur NH-31 to Manas National Park via Saudarvitha Ananda Bazar Road	2016
197.	Transport & Communication	Construction of Hangars and Apron at LGBI Airport, Guwahati	2016
198.	Transport & Communication	Hajo-Nalbari-Sarthebari Road	2007
199.	Transport & Communication	Silchar-Dwarband-Gaglacherra Road	2007
200.	Transport & Communication	Bishnupur - Nungba Road	2015
201.	Transport & Communication	Kangpokpi-Tamei Road	2017
202.	Transport & Communication	Tamenglong-Tamei Road	2013
203.	Transport & Communication	Agia-Medhipara-Phulbari-Tura	2013
204.	Transport & Communication	Improvement of Jowai-Khanduli-Baithalangsu road	2014
205.	Transport & Communication	ISBT Mawlai – Mawiong	2016
206.	Transport & Communication	Rymbai-Bataw-Borsora-Jalalpur road	2008
207.	Transport & Communication	Khedacherra - Damcherra - Kwarthah-Tuilutkawn road	2016
208.	Transport & Communication	Serkhan-Baghabazar road	2014
209.	Transport & Communication	Thanlon Singhat (Ngopa Tuivai)	2013
210.	Transport & Communication	Construction of Longding-Nokajan road	2013
211.	Transport & Communication	Mokokchung (NH-155), NH-202 Junction to Aghunato via Longsa-Suruhoto road	2015
212.	Transport & Communication	Viswema-Kedima-Zuketsa road	2013
213.	Transport & Communication	Construction of 26 Nos. of Rural foot bridges in Sikkim	2019
214.	Transport & Communication	Improvement of Sangkhola-Zingla road	2013
215.	Transport & Communication	Reshi-Legship to Bermick road	2014
216.	Transport & Communication	Sangkhola-Sumin Road	2013
217.	Transport & Communication	Agartala-Mohanpur-Chebri raod	2008

218.	Transport & Communication	Bishalgarh-Boxanagar-Sonamura-Borpathari- Belonia road	2013
219.	Transport & Communication	Dharmanagar-Tilthai-Damcherra road	2009

*(*Source: Projects dashboard of MDoNER, only completed projects)*

Conclusion:

In 2016, during the 65th NEC Plenary Session held at Shillong, Hon'ble Prime Minister of India Shri Narendra Modi expressed the views regarding northeastern region of India and termed it as 'Ashta Lakshmi' and suggested to focus more on the development of the region. The role of NEC in this regard is very significant and can be a unique mechanism in the development of this part of the country. In regard to that recently, Prime Minister of India, Shri Narendra Modi also announced a special development scheme named PM-devINE (Prime Minister's Development Initiative for North East) to expedite the further development progress of the region.

By analyzing all the point mentioned above, it can be viewed that this is the Amrit Kaal of North Eastern Region to grow at par with other parts of the country or even exceed that, but the tasks which still lie ahead continue to be difficult and challenging. Despite all the progress that has been made over the last 50 years, the North Eastern region of India still needs to do more as having such enormous potentiality. A lot has done but a lot has to be done.

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Agro-biodiversity Walk: An Awe-Inspiring Experience

By **Dr. Natasha R Marak,** *Assistant Professor, Department of Food Science and Nutrition, College of Community Science, Central Agricultural University, Tura, Meghalaya*

Introduction

Agro-biodiversity, often referred to as ABD, encompasses the variety and variability of plants, animals, and microorganisms used directly or indirectly for food and agriculture. This diversity is crucial not only for environmental sustainability but also for the resilience of local food systems (Food and Agriculture Organization of the United Nations, 2019). Agro-biodiversity ensures that communities can rely on a wide array of food sources, thereby promoting nutritional security and health. In today's rapidly changing world, where industrial agriculture dominates, conserving this diversity is more important than ever.

One innovative approach to preserving and appreciating agro-biodiversity is the ABD walk. Although well-known among nature conservationists, the concept is relatively new to many, including myself. These walks are designed to introduce participants to local food systems through guided tours of forests and other natural areas. Led by local knowledge holders or custodians of food systems, these walks educate participants about various food plants, wild edibles, medicinal herbs, and even non-conventional food sources like insects. The primary objective is to pass down traditional knowledge about food usage, beliefs, and conservation methods from one generation to the next.

Background and Preparation

My introduction to the ABD walk came when I was invited to join one organized by NESFAS (North East Slow Food and Agrobiodiversity Society) at Darechikgre under Rongram Block, Meghalaya. NESFAS is an organization dedicated to preserving agro-biodiversity and promoting sustainable food systems. Their efforts are particularly focused on the indigenous knowledge systems of Northeast India.

In preparation for the walk, our group of about thirty people, including school children, college students, school teachers, village elders, and identified knowledge custodians from the village, gathered early in the morning. Excitement and curiosity were palpable among the participants, many of whom, like me, were experiencing an ABD walk for the first time. We were briefed about the walk's objectives and the importance of each plant and herb we would encounter.

The Journey Begins

As we ventured into the forest, the serene beauty of our surroundings quickly enveloped us. It was not even two minutes into the walk when we first identified wild edibles. The village elders accompanying us explained the uses and medicinal properties of these plants, igniting a sense of wonder among the participants. One of the first notable discoveries was a tree called ‘Gakgil’. The aroma of its bark immediately reminded me of the balms used to soothe pain, illustrating the deep connection between nature and traditional medicine.
Another fascinating find was the ‘Cha’ku Jakma’, a nut with a taste reminiscent of chestnuts.

This discovery led to a discussion on the potential of local nuts to replace more expensive ones like almonds and walnuts, which are often sourced from distant regions. The diversity of plants and their various uses were a testament to the rich knowledge held by the local custodians.

Medicinal Discoveries

Throughout the walk, we encountered numerous medicinal plants. Village elders shared stories of how these plants had been used for generations to treat various ailments. One elder recounted how a particular leaf had cured him of a skin infection in just three days. Such anecdotes highlighted the invaluable traditional knowledge that is at risk of being lost in today's fast-paced world.

We also learned about a specific concoction of 'Gogarek' + 'Me'mang ambare' + 'men'di' used to treat cataracts. The detailed descriptions of these medicinal plants and their uses were not only educational but also inspiring. It was evident that these plants held immense potential for modern medicine, and validating their traditional uses through scientific research could open new avenues for natural treatments.

Interaction with Local Knowledge Holders

One of the most enriching aspects of the ABD walk was the interaction with local knowledge holders. These individuals are the custodians of traditional wisdom, and their insights were invaluable. They spoke passionately about the importance of preserving this knowledge and passing it down to future generations. The stories they shared were filled with a deep respect for nature and a profound understanding of the environment.

The knowledge holders also emphasized the importance of sustainable practices in food systems. They explained how traditional methods of cultivation and harvesting were designed to maintain ecological balance and ensure the long-term availability of resources. Their wisdom underscored the need for a harmonious relationship with nature, a lesson that is increasingly relevant in today's context.

Experiencing Nature

Walking through the forest was a transformative experience that profoundly connected us to the natural world. The concept of 'forest bathing', which involves immersing oneself in the natural environment to promote physical and mental well-being, came to life during the ABD walk. Forest bathing, or Shinrin-yoku, has been shown to reduce stress and improve mental health (Park et al., 2010). The sensory experiences—the sight of vibrant greenery, the sound of rustling leaves and chirping birds, the scent of fresh earth and blooming flowers—combined to create an atmosphere of tranquility and rejuvenation.

For many participants, particularly those from urban areas, the ABD walk offers a rare opportunity to disconnect from the digital world and reconnect with nature. The forest, with its diverse flora and fauna, becomes a living classroom, where every step reveals a new lesson. The experience of touching the rough bark of ancient trees, tasting wild edibles, and smelling the aromatic plants heightens awareness and appreciation of the natural world.

The sounds of the forest play a significant role in this immersive experience. The gentle hum of bees, the distant call of birds, and the rustle of leaves created a soothing symphony that calmed the mind and invigorated the spirit. These natural sounds, free from the noise pollution of urban life, have been shown to reduce stress and improve mental clarity.

Additionally, the physical act of walking through the forest promotes physical health. The varied terrain provides a gentle workout, enhancing cardiovascular health and muscular strength. The fresh, oxygen-rich air revitalizes the body, contributing to overall well-being.

Experiencing nature through an ABD walk is more than just a pleasant outing; it is a profound reminder of our intrinsic connection to the environment. It underscores the importance of preserving these natural spaces, not just for their ecological value but also for the immense physical and psychological benefits they offer.

Community Gathering and Plant Analysis

At the end of our walk, we gathered at the local community hall to lay out our findings. The collection was impressive: 51 medicinal plants and 16 wild edibles, and we hadn't even ventured deep into the forest! The villagers proudly informed us that there were many more such plants to be discovered.

We segregated our collection into wild edibles and medicinal plants, labeling each one carefully. The village elders shared their knowledge about the uses of each plant, turning the session into an engaging storytelling experience. For example, some of the medicinal plants we came across included 'sam mikchip', 'dotekmi', 'do'jagipe', 'dichenggrip', and 'e'kuru'. The wild edibles included 'dadarimet', 'kitma', 'te'kisambak', and 'choksua', to name a few.

This session highlighted the importance of traditional knowledge in understanding and utilizing the natural resources available to us. It also opened up the possibility of validating these traditional beliefs through scientific analysis of the nutrients and minerals found in these plants.

Educational Impact

One of the most significant takeaways from the Agro-biodiversity (ABD) walk is its profound educational impact. Integrating ABD walks into educational curricula provides students with a holistic learning experience that transcends the traditional classroom setting. This experiential learning approach can foster a deeper understanding of ecology, biodiversity, and sustainable living, equipping students with knowledge and skills that are increasingly important in today's world (Kolb, 1984).

Hands-On Learning Experience

ABD walks offer students a unique opportunity to engage in hands-on learning. Unlike conventional classroom education, where knowledge is often abstract and theoretical, ABD walks immerse students in real-world environments. They get to see, touch, and taste the plants they study, which enhances their sensory learning and makes the educational experience more memorable and impactful. This direct interaction with nature helps students develop a tangible connection to the subject matter, fostering a greater appreciation for biodiversity and the environment (Dillon et al., 2006).

Enhancing Curriculum Relevance

Incorporating ABD walks into the curriculum can make educational content more relevant and relatable for students. When students learn about plants, ecosystems, and conservation in the classroom and then experience these concepts firsthand during an ABD walk, the theoretical knowledge gained in the classroom is reinforced and brought to life. For example,

studying the medicinal properties of plants in textbooks is far less impactful than hearing stories from local knowledge holders about how these plants have been used for generations to treat ailments (World Health Organization, 2002). This contextual learning helps students understand the practical applications of their studies, making the education process more engaging and effective.

Fostering Critical Thinking and Inquiry

ABD walks encourage critical thinking and inquiry-based learning. As students explore the forest and encounter various plants and herbs, they naturally ask questions about their uses, properties, and significance. This curiosity-driven approach to learning fosters a scientific mindset, as students seek to understand the natural world through observation, questioning, and experimentation. They learn to identify plants, understand their roles in the ecosystem, and consider the broader implications of biodiversity conservation (Tilman et al., 1997). This critical thinking skill is essential for problem-solving and innovation, preparing students to tackle complex environmental challenges in the future.

Promoting Environmental Stewardship

One of the key educational outcomes of ABD walks is the promotion of environmental stewardship. By exposing students to the rich biodiversity of their region and the traditional knowledge associated with it, ABD walks instill a sense of responsibility and care for the environment. Students learn about the importance of conserving natural resources and the sustainable practices that have been passed down through generations (Berkes, 2012). This understanding inspires them to take an active role in conservation efforts and to advocate for sustainable practices in their communities.

Encouraging Intergenerational Learning

ABD walks also facilitate intergenerational learning, where students interact with village elders and knowledge custodians who share their traditional wisdom. This exchange of knowledge across generations enriches the educational experience, providing students with insights that are not available in textbooks (Newman & Hatton-Yeo, 2008). It helps preserve traditional knowledge and ensures that valuable cultural practices are not lost. Moreover, this interaction fosters respect for elders and an appreciation for the cultural heritage of their community.

Inspiring Future Careers

Exposure to ABD walks can also inspire students to pursue careers in environmental conservation, botany, ethnobotany, and related fields. By witnessing the practical applications of traditional knowledge and the importance of biodiversity firsthand, students may be motivated to contribute to the preservation of these resources (Shiva, 1988). This can lead to a new generation of scientists, conservationists, and advocates who are dedicated to protecting the environment and promoting sustainable living.

Integrating ABD walks into educational curricula offers a myriad of benefits. It enhances the learning experience by making it hands-on and relevant, fosters critical thinking and environmental stewardship, facilitates intergenerational learning, and inspires future careers in conservation. By providing students with these enriching experiences, we can cultivate a generation that is knowledgeable, conscious, and committed to preserving our planet's biodiversity.

Future of ABD Walks

The future of Agro-biodiversity (ABD) walks holds immense potential for fostering sustainable development, enhancing environmental education, and promoting cultural heritage. As awareness of the importance of biodiversity grows, ABD walks can play a critical role in bridging the gap between traditional knowledge and modern conservation practices.
Sustainable Livelihoods.

One promising aspect of the future of ABD walks is their potential to generate sustainable livelihoods for rural communities. By formalizing and promoting ABD walks as eco-tourism ventures, local communities can benefit economically while preserving their natural and cultural resources (Honey, 2008). These walks can attract tourists, researchers, and educators, providing a steady source of income for guides, local artisans, and hospitality providers. This not only supports the local economy but also incentivizes the conservation of biodiversity and traditional knowledge.

Technological Integration

The future of ABD walks can also benefit from technological advancements. Mobile apps and digital platforms can be developed to enhance the ABD walk experience. These tools can provide participants with additional information about the plants and ecosystems they encounter, facilitate real-time data collection and sharing, and connect participants with a broader network of conservationists and researchers. Technology can also help document and preserve traditional knowledge for future generations.

Urban Integration

The concept of ABD walks can also be adapted and introduced to urban settings. Urban residents often have limited exposure to natural environments and traditional knowledge systems. Organizing ABD walks in urban green spaces, botanical gardens, and community parks can help city dwellers reconnect with nature and appreciate the importance of biodiversity. These walks can also foster a sense of community and promote sustainable living practices among urban populations.

Global Outreach

While ABD walks are currently more common in specific regions, there is potential for global outreach and adaptation. Sharing the concept and methodology of ABD walks with communities worldwide can help promote biodiversity conservation on a global scale. International collaborations can lead to the exchange of knowledge and best practices, enriching the ABD walk experience and fostering a global community committed to preserving agro-biodiversity.

Conclusion

The ABD walk was a truly awe-inspiring experience that left a lasting impact on all of us. It not only provided a deeper understanding of agro-biodiversity but also highlighted the importance of preserving traditional knowledge and sustainable practices. The walk reinforced the idea that whatever grows locally is best suited for the people residing in that area, echoing the popular statement 'Vocal for Local'.

As we move forward, it is crucial to continue promoting and participating in ABD walks. They offer a unique opportunity to reconnect with nature, learn from our elders, and ensure that traditional knowledge is passed down to future generations. I hope this article inspires other academicians, teachers, and the general public to experience ABD walks and enrich their lives.

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Paddy Rice Status and its Ecosystem Embodied in the Hilly Terrain of Nagaland

Kehokhunu
SAS, School of Agricultural Sciences, Medziphema, Nagaland-797106
Email: kehozhotso@gmail.com

Abstract

With more than 60% of the state's population depending on agricultural sector and rice being highly linked with the livelihood of the people, study shows that the area under rice cultivation to be greater than other crops. About 49% of area is under rice out of 51% total cropped area. Rice area under Jhum is around 56% with Wet Terrace Rice cultivation occupying about 44%. Shifting (Jhum) and Wet terrace cultivation are commonly practiced system in the state. It can be inferred from the data that Wet terrace rice cultivation (WTRC) has been in an increasing trend as compared to Jhum rice cultivation. Data on rice area, production and yield of Nagaland was collected for five years period i.e., 2017-18 to 2020-22 stated that there was not much significant changes during 2017-18 to 2019-20, except for 2021-22 where the production and yield was affected due to draught like condition. Also, state wise data collected for the average of 2016-17 to 2020-21shows N.E to be aself-sufficient state. However, Nagaland was found to have the lowest productivity in rice among other north easter states (medium low productivity), hence has a wider scope to elevate and overthrow its current status through proper management and practices.

Keyword: Nagaland, North east, Rice ecosystem, Rice, Area, Production.

Introduction

Rice is embedded deeply in the socio and economic life of the people of Nagas. It has played a pivotal role in the livelihood of the people with more than 60% depending on agriculture for livelihood. Rice accounts for a major share of area in the state followed by maize, millets and other minor crops like pulses, oilseeds and commercial crops (Nagaland Statistical Handbook, 2022). The area under cultivation of cereal occupies about 66 % with cultivation of paddy occupying almost 49 % of the total cropped area. (Directorate of Economics and Statistics, Nagaland. 2023.).Two method of cultivation is mostly practiced in Nagaland wherein 86% of cultivable area is under jhum and terrace cultivation system. Rice being a major diet crop of the state is grown both in lowland and upland condition. It is cultivated over an area of 1. 2 lakhs hectare with a production of 240.924 metric tons (Nagaland Statistical Handbook, 2022). Majority of the population in the hilly terrain of Nagaland being a rice dominant state give importance to cultivation of local cultivars, engaging themselves with different local cultivars. The traditional landraces can serve as an important gene pool for valuable traits, for example, the upland landraces of rice present in northeast India are drought tolerance, photoperiod insensitivity, disease and insect tolerance, better root system, etc. (Verma et al., 2021; Konjengbamet al., 2021).

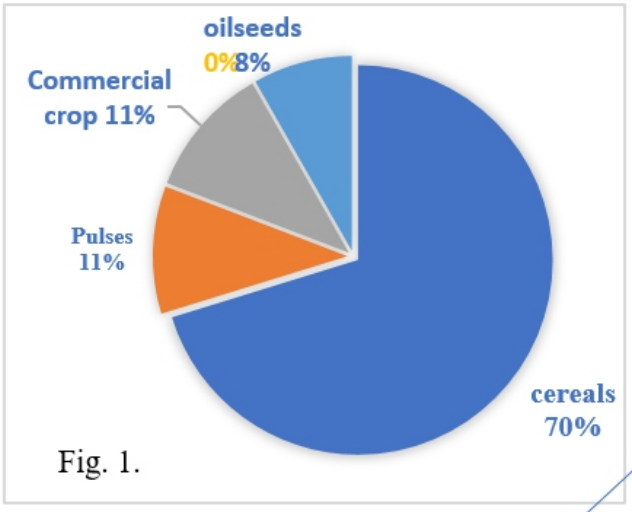


Fig. 1.

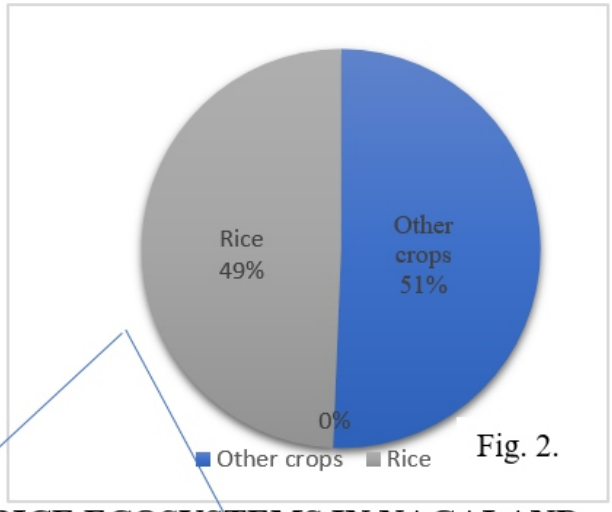


Fig. 2.

RICE ECOSYSTEMS IN NAGALAND

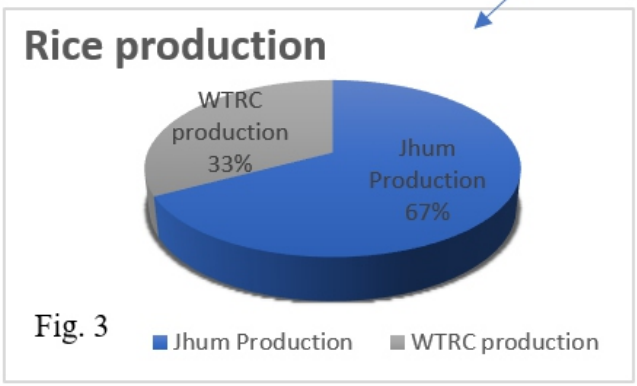


Fig. 3

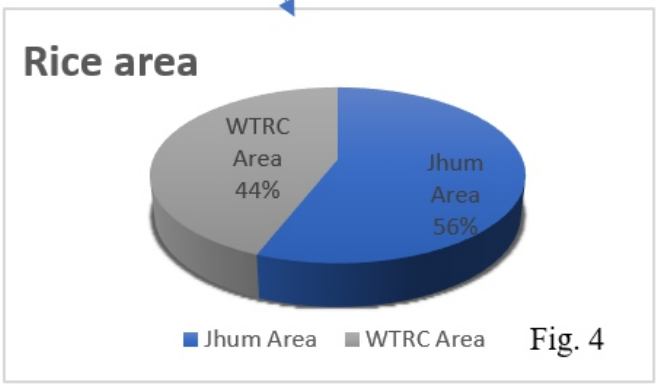


Fig. 4

Rice is grown in a wide range of climatic conditions ranging from deep water to high altitudes. It is mainly cultivated under two farming situations namely: Upland- jhum/shifting cultivation (rainfed upland) and wet rice cultivation i.e., settled agriculture in valleys between hills and terraces made on hill slopes.

Upland-Jhum rice ecosystem

This a form of farming practiced in and out-of-the-way upland spaces in low rainfall areas without surface water accumulation in slopes ranging from 40-60°.This system is generally done in high altitude mountain terrain ranging from 500-2000m (asl) with moderate to steep slopes practiced in Tuensang, Zunheboto some parts of wokha, Mokokchung, Kohima, Mon, Medziphema area of Dimapur. (NEPED and IIRR. 1999; Konjengbamet al., 2021).Jhum constitutes about 72% of total cultivable area and contributes to the total rice production about 49.26%. (Solo andKikhi, 2021).These systems are mainly confined to tracts which depend on rains and do not have supplementary irrigation facilities. Varieties of rice are cultivated in a single Jhum field. Rice in this system are directly seeded. Most upland rice growing conditions have unique environmental features which represent usually slopping land with erosion problems and poor physical and chemical soil properties. Some suitable varieties of rice that can be grown under upland jhum rice cultivation are: Keritsuk, Mange, Temesungtsuk, Mehourou (local), Sungmangtsuk, Keritsuk, Longkhumtsuk, Shiko, Tangakezei, Rengma Lha, Likhamo, Temesungtsuk

Fig 2. Left; Rice Jhum Field preparation. Right; Rice grown in Jhum upland condition

Table no: 1 Trends of Jhum Paddy area and production in different districts of Nagaland (A=000 hectare; P= 000 tones)

Distict	Year									
	2017-18		2018-19		2019-20		2020-21		2021-22	
	A	P	A	P	A	P	A	P	A	P
Kohima	5.18	10.34	5.15	10.24	5.14	10.22	5.13	10.21	2.35	3.53
Phek	1.67	3.33	1.64	3.26	1.63	3.25	1.62	3.23	1.75	2.98
Mokokchung	9.35	18.67	9.32	18.55	9.30	18.52	9.29	18.50	8.30	18.28
Tuensang	10.08	20.14	10.05	19.98	10.02	19.94	10.01	19.92	11.50	17.25
Mon	15.99	31.91	15.93	31.70	15.89	31.64	15.88	31.62	16.50	30.20
Dimapur	9.15	18.29	9.07	18.04	9.05	18.01	9.04	17.99	4.64	9.75
Wokha	10.12	20.22	10.09	20.06	10.05	20.02	10.04	20.00	8.02	8.83
Zunheboto	9.26	18.48	9.23	18.37	9.21	18.34	9.20	18.32	9.49	17.53
Peren	6.38	12.75	6.32	12.55	6.31	12.53	6.30	12.51	3.18	3.82
Kiphire	8.48	16.94	8.45	16.81	8.43	16.78	8.43	16.76	1.51	2.00
Longleng	5.83	11.62	5.80	11.52	5.80	11.50	5.80	11.49	2.40	4.90
Noklak	-	-	-	-	-	-	-	-	3.20	5.44
Nagaland	91.49	182.69	91.04	181.08	90.83	180.75	90.74	180.57	72.87	124.49

Source: Nagaland Statistical Handbook, 2022.

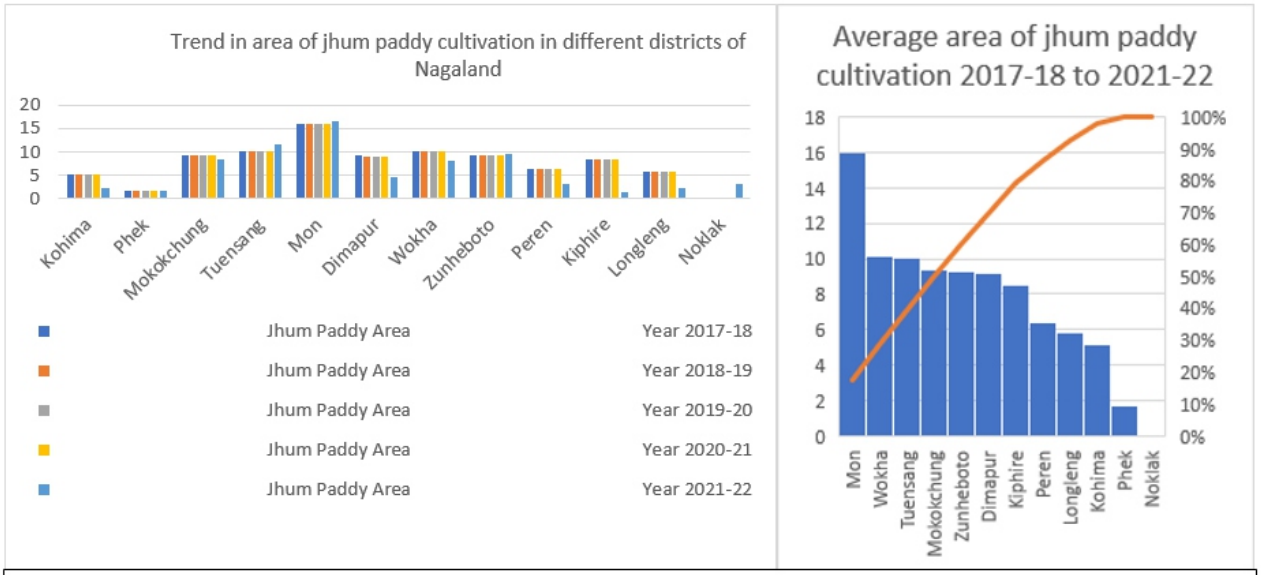


Fig:1.1. Trend in area of *jhum* paddy cultivation in Nagaland

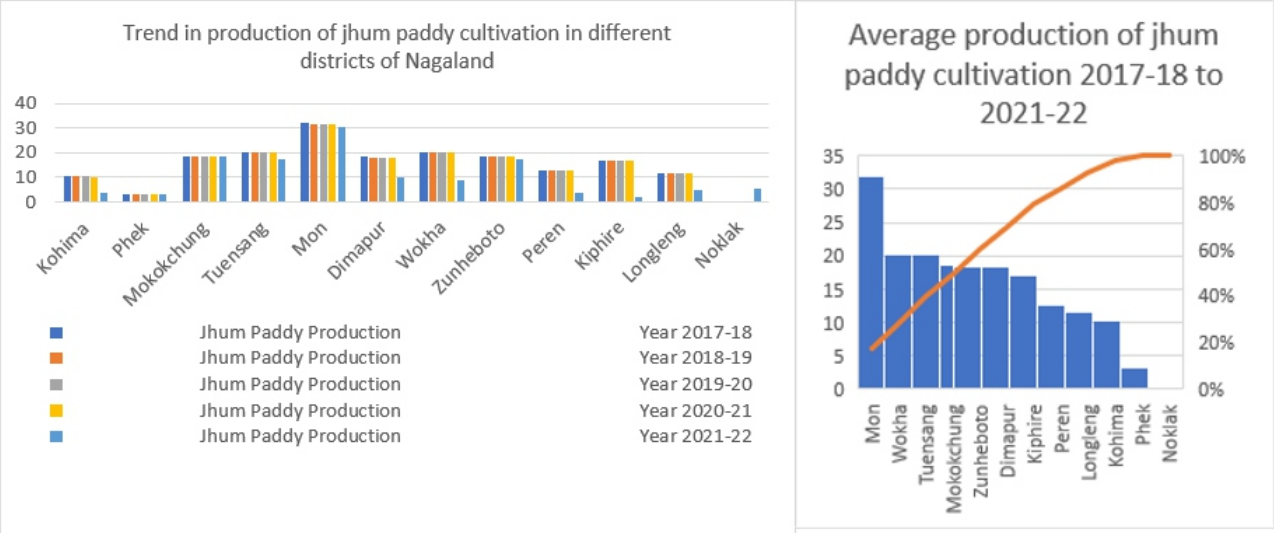


Fig. 1. 3.Trend in production of *jhum* paddy cultivation in Nagaland

WET RICE CULTIVATION

It is practiced in hilly as well plain areas of Nagaland. It is categorised into two
(1) Wet rice cultivation (Rainfed)
(2) Wet Terrace rice cultivation (Irrigated)

1. Wet rice cultivation (WRC)

Wet Rice Cultivation (WRC) is carried out in the rainfed lowlands of Nagaland. Rice are cultivated in low-lying valleys or in gentle slopes (i.e., from 200 - 1000 m). In this methodbunds are constructed to divide the plot into a number of smaller sections allowing the crops to be partially submerged for some parts of the year. It is mostly rainfed. Wet rice cultivation is mainly practiced in the foothills bordering the state of Assam. (Khuvung and Mishra, 2023). It can also be seen in the low lying areas like Dimapur, Jalukie, Tizit (Mon), Baghty (Wokha) and Longnak valley (Mokokchung) (NEPED and IIRR. 1999; Konjengbamet al., 2021).Some varieties suitable forWRC are:Temesungtsuk, Koyabo, Tangakezei, Kada special(local).

2. Wet Terrace rice cultivation (WTRC)

Wet terrace paddy cultivation also known as pani-kheti in local dialect, is a more modern traditional cultivation method of preparing terraced fields. Rice is transplanted along the fields in terraces built along the slopes, cultivated in 500-1000 m (asl) (NEPED and IIRR. 1999;

Konjengbamet al., 2021). The terraces are usually cut slopes in hilly areas into a series with water depth of 8-10cm which resemble stairs and irrigation is by rain or other water channels and streams. Small water channels and outlets are constructed, along with bunding at the edges for proper water disposal/distribution of water in each terrace where water flows timely from one terrace to another for proper water usage. Abundant rainfall and/or irrigation is an important factor. Wet terrace cultivation is confined to Kohima and Phek districts and in certain other areas like Kohima, Mon and Tuensang. Date of sowing varies from region-to-region. Eg., in Northern Angami zone, cultivation of rice usually commences in month of July, on the other hand Southern Angami take up during May. Some varieties suitable for WRC are: Tangakezei Mange, Likhamo, Mehouru, Ngobano, Nagaland special, K. series.

Fig 3. Rice cultivation under Wet rice cultivation

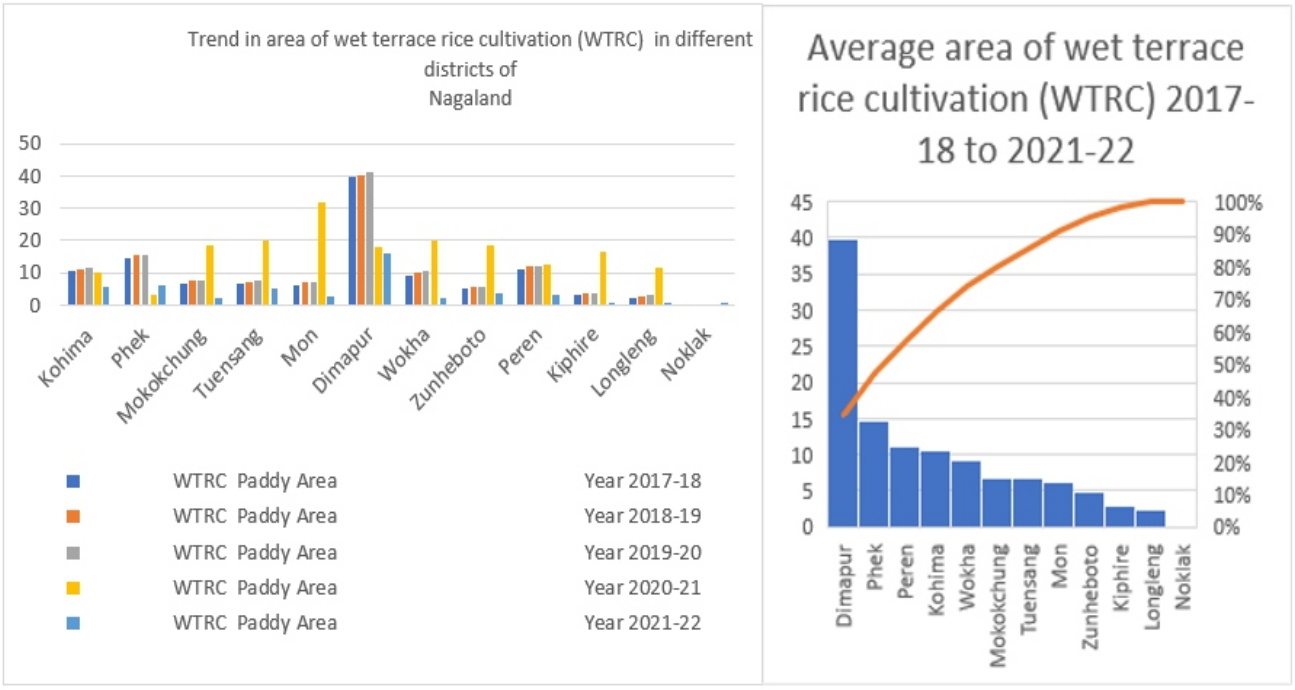
study trial was carried out by Longkumerand Giribabu, 2019, to determine the efficiency of production in wet rice cultivation under Dimapur and wet terrace cultivation under Phek districts of Nagaland. This trial revealed that WRC under Dimapur recorded maximum productivity than WTC under Phek, due to better utilisation of inputs like fertilizers, seeds, machineries and access to irrigation which contributed on achieving higher productivity and production as compared to the other.

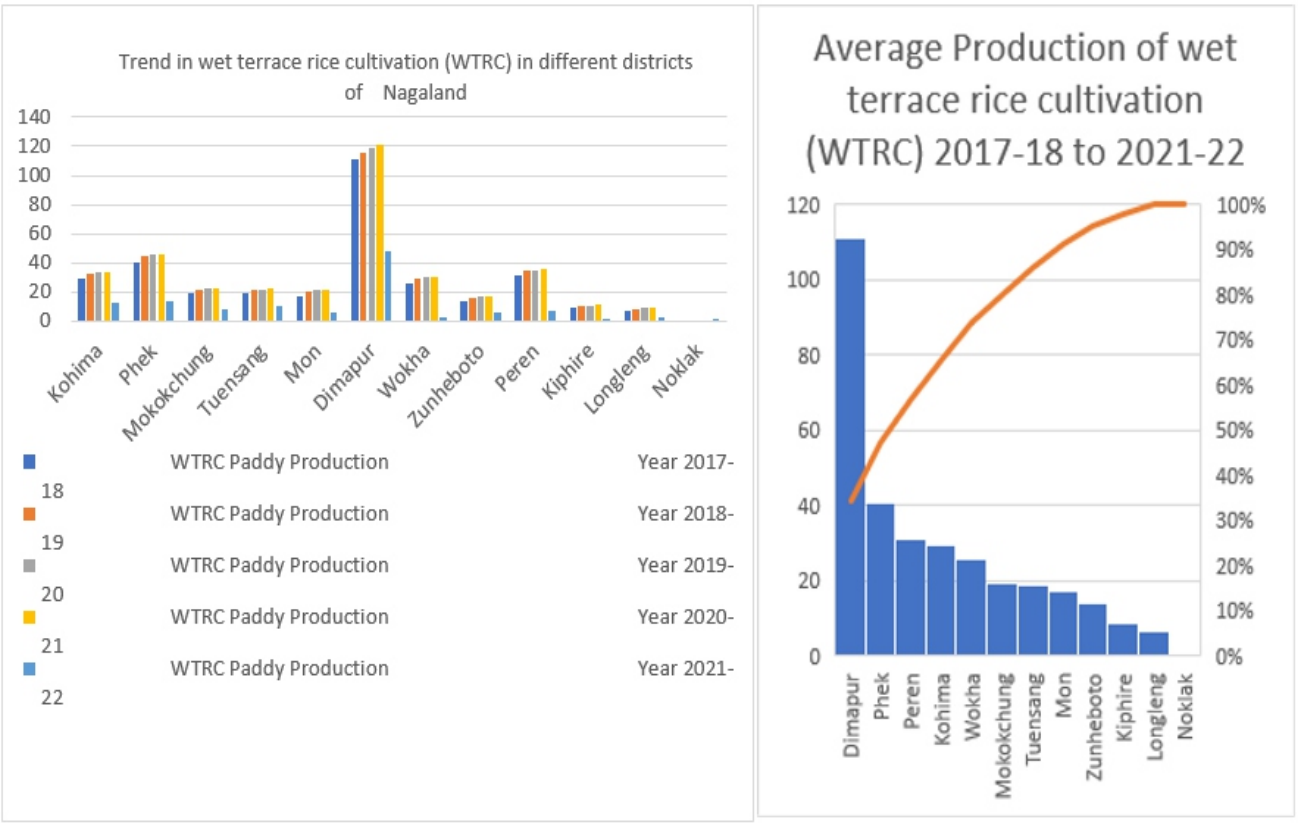
Table No: 2. Trends of area and production under Wet Terrace Rice Cultivation (WTRC) of different districts of Nagalanddistricts of Nagaland
(A=000 hectare; P= 000 tones)

Distict	Year									
	2017-18		2018-19		2019-20		2020-21		2021-22	
	A	P	A	P	A	P	A	P	A	P
Kohima	10.58	29.58	11.27	32.30	11.51	33.22	10.21	33.76	5.88	12.76
Phek	14.56	40.72	15.41	44.25	15.73	45.51	3.23	46.25	6.00	13.21
Mokokchung	6.88	19.25	7.54	21.70	7.70	22.32	18.50	22.68	2.46	7.87
Tuensang	6.64	18.57	7.35	21.13	7.51	21.73	19.93	22.08	5.00	10.00
Mon	6.18	17.26	7.12	20.35	7.30	20.98	31.63	21.39	2.70	5.50
Dimapur	39.74	111.13	40.40	115.82	41.30	119.21	17.99	121.27	16.03	47.79
Wokha	9.21	25.79	10.20	29.28	10.42	30.12	20.00	30.63	2.04	2.28
Zunheboto	4.98	13.92	5.64	16.18	5.76	16.64	18.32	16.91	3.50	5.26
Peren	11.04	31.00	11.93	34.15	12.20	35.15	12.51	35.77	3.29	7.23
Kiphire	3.08	8.60	3.64	10.46	3.72	10.76	16.76	10.93	0.80	0.94
Longleng	2.28	6.38	2.91	8.34	2.97	8.58	11.49	8.72	0.80	2.30
Noklak	-	-	-	-	-	-	-	-	0.72	1.30
Nagaland	115.17	322.20	123.41	353.96	126.12	364.22	180.57	370.38	49.21	116.43

Source: Nagaland Statistical Handbook, 2022

Fig: 2.1. Trend in Area under WTRC in Nagaland

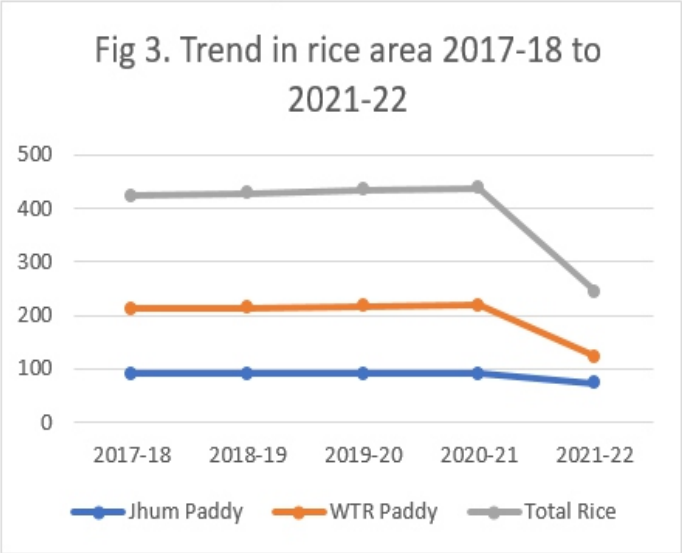




Based on the data of different districts of Nagaland (Table no.1) over a period of 5 years 2017-18 to 2021-22shows that Mon district has the highest area and production whereas Phek and Noklak showed the lowest area and productin under rice Jhum cultivation. Whereas area and production under wet terrace rice cultivation shows that Dimapur has the highest area and production whereas Noklak followed by longleng, Kiphire has the lowest area and production.

Table. 3. Trend in Area of rice in Nagaland (A= Area in 000 Hectare)

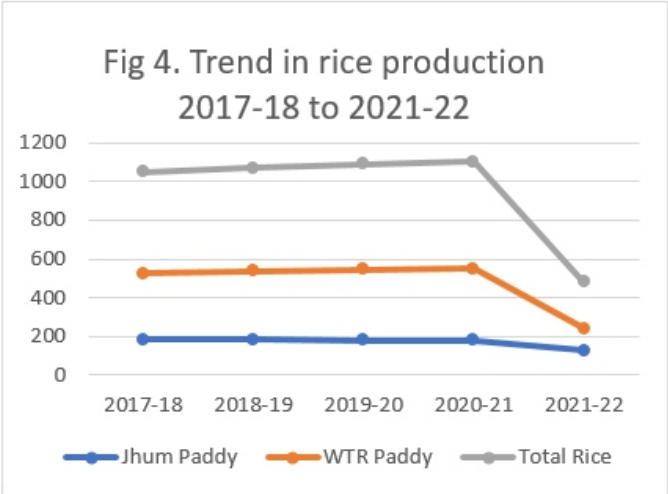
Year	*Jhum* Paddy	WTR Paddy	Total Rice
2017-18	91.25	120.75	212.00
2018-19	91.04	123.41	214.45
2019-20	90.83	126.12	216.95
2020-21	90.74	128.07	218.81
2021-22	72.86	49.21	122.07



Source: Nagaland Statistical Handbook, 2017-18 to 2021-22

Table. 4. Trend in Production of rice in Nagaland (in '000 tonnes)

Year	*Jhum* Paddy	WTR Paddy	Total Rice
2017-18	181.57	342.87	524.44
2018-19	181.08	353.96	535.04
2019-20	180.75	364.22	544.97
2020-21	180.57	370.38	550.95
2021-22	124.49	116.43	240.92

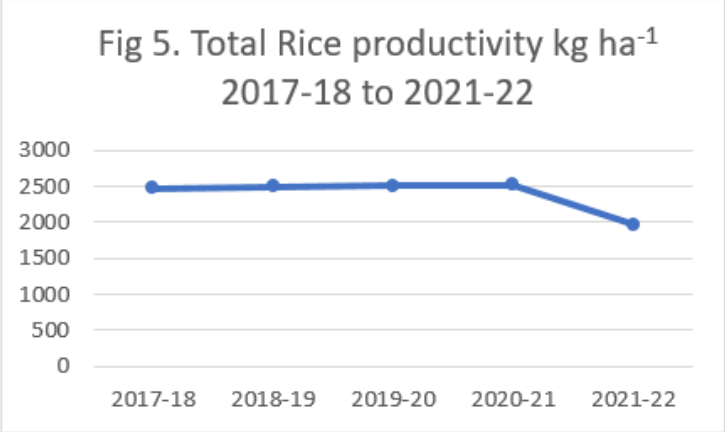


Source: Nagaland Statistical Handbook, 2017-18 to 2021-22

Table 3 and 4 shows that there is an increasing trend in wet terrace rice cultivation WTRC), only showing a huge decline of WTRC of49.21 ha-1 from 128.07 ha-1 in 2020-21 and 2021-22, respectively.Contrary to this it can be clearly seen (Table 3 and 4)that Nagas are leaning more towards WTRC as this system of cultivation provides more yield (table. 6.), it isalso apermanent form cultivation which is getting readily accepted by the residence over time. Shifting cultivation has been reported to be economically unviable (Tawnengaet al., 1996; Sati, 2020). Therefore, the future of WRC is potentially very high. It has been suggested by Sati (2020) that if a sizeable portion of arable land is devoted to wet rice cultivation and adequate irrigation facilities are provided, then the production and yield of rice will increase multifold. It was further documented that system of rice intensification can also be a suitable approach to increase the production under WRC.

Table. 5. Trends in productivity of rice grain in Nagaland (kg hectare-1) 2017-18 to 2021-22

Year	Total Rice productivity kg ha^{-1}
2017-18	2473
2018-19	2494
2019-20	2511
2020-21	2517
2021-22	1973



Source: Nagaland Statistical Handbook, 2017-2022

As can been see from table 4. rice production of the state reduced to 24092 m t in 2021-22 from 55095 m t in 2020-2, this is reflected in productivity of rice (Table. 5.)owing to a drought-like situation faced by the state. Yield also similarly registered a decline from 2517 kg ha -1 in 2020-21 to 19733 kg ha -1 in 2021-22 which is by far the lowest recorded in all the years. With improved agro-climatic conditions, the production productivity is expected to increase in the following years.(Directorate of Economics and Statistics, 2023).

Table 6. Yield of rice under Jhum and Wet terrace rice cultivation system

Major land use system	Productivity/ yield t ha^{-1}
Panikheti/WTRC	2.5-3.0 t ha^{-1} (Solo and Kikhi. 2021).
Jhum	=1 t ha^{-1} (Rajkhowa*et al.*, 2017)

OVERVIEW OF STATUS OF RICE IN NORTH EASTERN STATE

Table 7. State-wise Normal Area, Production and Yield (Average of 2016-17 to 2020-21)Table. 8. Productivity status

State	Area (000 hectare)	Production (000 tonnes)	Productivity (kg ha^{-1})
Arunachal Pradesh	32.69	237.03	1786
Assam	2395.40	5086.21	2123
Manipur	223.12	485.49	2176
Meghalaya	110.37	261.77	2372
Nagaland	213.77	354.75	1659
Sikkim	9.36	17.36	1855
Tripura	270.34	806.65	2984
All India	44270.97	116434.50	2630

Source: Directorate of Economics & Statistics. Agricultural Statistics, New Delhi 2022.

High productivity	> 2500 kg ha^{-1}
Medium Productivity	> 2000-2500 kg ha^{-1}
Medium-low productivity	> 1500-2000 kg ha^{-1}
Low productivity	1000-1500 ka ha^{-1}
Very low productivity	< 1000 ka ha^{-1}

Source: Rice productive analysis in India. http://drdpat.bih.nic.in/PA-Table-17-Nagaland.htm

The total area, production and yield for the NEH states of India computed from 2016-17 to 2020-21, is presented in Table no. 7. When we look NEH states as a whole, the region is self-sufficient in rice considering the shortage is made up from the surplus of other states. As represented Table. 8and 9.shows that the state's productivity (1659) is under medium-low productivity which is the lowest amongst all the North Eastern State. This is due to adoption of old and traditional practices without proper agronomical measures, lack of knowledge about HYV and land unavailability which is limiting factor.

Conclusion

Though North eastern state as a whole is self-sufficient in rice considering the shortage is made up from the surplus of other states.The production and productivity of rice in this region is below the national average because of its fragile ecosystem and the varied physio-graphic conditions pertaining to this region. Nagaland one of the seven sisters in the North eastern regionhas a medium low productivity status. In spite of agriculture being the main occupation of the people, the state still has to import food items from other states. This is due to the fact that people followunsustainable agricultural practices and subsistence farming rather thanorienting towards large scale commercialized farming system. There is also a needto tackle climate change more than ever by adopting proper strategies as well as implementing proper agronomical measureswith new technology and tested varieties suitable for the location. Integrating all the possible strategies along with traditional knowledge can help with farmers' local economy as well as the economy of the state.

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Wild fagaceous nut diversity from the mild-tropical forest area of Kyrdemkulai, Meghalaya – Potential local dietary source for nutritional security

M. Premi Devi[1]*, H.G. Kencharaddi[2], L. Sanajaoba Singh[3], Sofia Yanglem[4] and Ram Singh[5]

*[1]*Assistant Professor (Horticulture), College of Agriculture, Kyrdemkulai (CAU-Imphal), Meghalaya*
[2]Assistant Professor (GPB), MTTC&VTC, College of Community Science, Tura (CAU-Imphal), Meghalaya
[3]Assistant Professor (Plant Pathology), College of Agriculture, Kyrdemkulai (CAU-Imphal), Meghalaya
[4]Subject Matter Specialist (Agronomy), Krishi Vigyan Kendra, East Garo Hills (CAU-Imphal), Meghalaya
[5]Professor (Agril. Economics) & Dean, College of Agriculture, Kyrdemkulai (CAU-Imphal), Meghalaya
*mpdhort69@gmail.com**

Introduction:

Meghalaya has a rich source of biodiversity with a dense forest area of 17,927 km2, but the potential of the existing flora is still underutilized. Indigenous fruits play a significant role in the food and livelihood security of people in developing nations (Mwema et al., 2012; Mabaya et al., 2014). Usually collected from the wild, these fruits provide an alternative source of nutrition and income during hard times (Muok et al., 2001) of the rural poor and the tribal (Deshmukh & Shinde, 2010). Some wild fruits are reported to have richer nutritional value than commercially cultivated fruits (Maikhuri et al., 1994). Recently, the consumption of wild fruits has decreased due to improvement and hybridization in commercially cultivated fruits. In modern society, the younger generations are in denial to even consume the local seasonal fruits because of dilution in the traditional knowledge and change in consumption habits, negligence and ignorance.

Importance:

Nuts are an important part of human nutrition and health as a source of protein, carbohydrates, vitamins, minerals, dietary fibre and phytonutrients (Ros, 2010). The utility of fagaceous nut has been minimal in the country as a whole. Even in the Kashmir valley, the apples have dominated the fruit industry profile for years (Pandit et al., 2013). Diversifying the fruit industry is necessary for addressing the social problem of health and nutrition insecurity, especially in women and children, poverty reduction, unemployment and conservation of rare species. Besides, it is important to develop local-based food habits, especially for the rural population. In Meghalaya, fageceous nuts are under-exploited in the region despite the existence of local diversity in the rich forest area of the state. These nuts are available during the dry winter months in the region (Makdoh et al., 2017). These underutilized nuts have tremendous potential and can be popularized for commercialization with proper value addition.

Distribution:

The Fagaceae family, including beeches, chestnuts and oaks comprises of eight genera with about 927 species (Christenhusz & Byng, 2016). These flowering trees are primarily deciduous in temperate regions, but appear as evergreen trees and shrubs in the tropics. They are genetically diverse groups and are distributed throughout the world, including North Eastern India. In India, fagaceous nuts are mainly grown in orchards and in the wild throughout the Himalayas up to Assam and Meghalaya at altitudes of 2000 to 3000 m ASL for edible nuts

(Pandit et al., 2013). Northeastern states are transition zones for Fagaceae members and have a floral affinity with Greater Himalaya, Central Himalaya, and Lesser Himalaya (Singh and Singh, 2016). A total of 35 species have been recorded from Northeastern states. The genus Quercus (14 species), Lithocarpus (11 species) and Castanopsis (9 species) were reported. Among the NE states, Arunachal Pradesh recorded 30 species, followed by Assam (27 species), Meghalaya (24 species), Sikkim (19 species), Nagaland (15 species), Manipur (12 species), Tripura (5 species) and Mizoram (4 species) (Singh and Singh, 2016).

Challenges and prospects:

Increase in urbanization and commercial exploitation of forests and waste lands have led to a threat in the existence of indigenous crops (Makdoh et al., 2017). Increase in climate catastrophe and unpredictability in the present day cannot guarantee food security in state of emergencies. Cultivation of commercial varieties can be taxing with respect to resources like water, nutrients and agronomic management. Fagaceous nuts can be grown and produced without pesticides, entirely organically (Pandit et al., 2013). These nuts can be grown easily in foothills where other fruit crops cannot be grown, (Pandit et al., 2013) and can be potential resources for the economy, environment and nutritional security.

Moreover, it is a high time and urgent requirement to diversify the daily diet based on locally available and easily cultivable food. It is a positive sign that in recent times, the under-utilized crops are beginning to take its place as an important component in the area of science, technology and research (Devi et al., 2018 a,b,c). These nut species propagate through seeds and possess vast genetic variability and heterogeneity for important traits. There is an urgent need to characterize and evaluate the available germplasm to identify area/state specific quality genotypes for commercial horticulture. The information will also help in preserving the genetic resources of these nut species. It will provide primary information for further studies like selection of desirable trees, biochemical, physiology and molecular characterisation of the existing races in the region.

Local diversity and utility:

Four fagaceous species viz., Castanopsis tribuloides (Sm.) A.DC, Castanopsis purpurella (Miq.) N. P. Balakr (Syn. Castanopsis hystrix A.DC.)., Castanopsis indica (Roxb. ex Lindl.) A.DC. and Lithocarpus fenestratus var. khasiana A.DC (The Herbarium, Royal Botanical gardens, Kew; Hooker, 1890; Singh and Singh, 2016) were identified from the mild-tropical forest area of Kyrdemkulai, Meghalaya (Devi et al., 2022). According to villagers, the local names of these species are Soh-ot-saw, Soh-ot-rit, Soh-ot-langkhraw and Soh-ot-dieam, respectively (Table 1). These nuts are usually found in the wild forest areas and not cultivated. The locals collect the nuts, consume raw or roasted. They are also sold in the local markets like Umsning, Iewduh, Bara Bazar, Shillong (Makdoh et al., 2017; Singh & Singh, 2016). These wild nuts like Castanopsis tribuloides andCastanopsis hystrix are also reported to be edible in other literatures (Dangol et al., 2017). The locals of Kyrdemkulai area don't have record or knowledge on other medicinal properties of these nut trees. However, Singh and Singh (2016) reported medical property of C. indica, its leaf decoction is used to treat stomach disorder, skin infection, resin for curing diarrhoea, bark paste to control chest pain and anti-cancer activity of ethanolic bark extracts of C. indica. Bark paste of Castanopsis tribuloides is applied to cure snakebites (Joshi et al., 2011), and leaves are used as fodder (Prasad Pokharel et al., 2021). Other utility includes firewood and timber (Aye et al., 2012). In recent studies, C. tribuloides bark

extract also demonstrated remarkable antipyretic activity (Hasan et al., 2022). The variability for important traits at intra and interspecies level is discussed as follows:

Table 1: Wild fagaceous nuts found in the mild-tropical forest of Kyrdemkulai, Ri-Bhoi, Meghalaya (Devi et al., 2022)

Species	Specimen reference	Local name	Peak Season	Local utilities	Market
Castanopsis purpurella (Miq.) N. P. Balakr.	http://specimens.kew.org/herbarium/K000832670	Soh-ot-saw	October-December	Consumed raw/roasted	Local markets, Umsning, Iewduh, Bara Bazar, Shillong
Castanopsis tribuloides (Sm.) A.DC	http://specimens.kew.org/herbarium/K000832662	Soh-ot-rit	October - December		
Castanopsis indica (Roxb. ex Lindl.) A.DC.	http://specimens.kew.org/herbarium/K000832671	Soh-ot-langkraw	October-December		
Lithocarpus fenestratus var. Khasiana A.DC	http://n2t.net/ark:/65665/3d33d97ce-0efb-432c-8df3-fb9682081df8	Soh-ot-dieam	August-October	Not consumed; Eaten by wild animals	

Conclusion:

Alternative utilities and traditional knowledge of locally potential wild species need to be explored to increase the value of these local nuts. The preliminary information provides knowledge for future studies like selection of the desirable types, biochemical, physiology and molecular characterisation of the existing races in the region which will serve as reservoir of genetic resource, genetic improvement, conservation and utilization of these nuts more extensively. This will, in turn, help to achieve food and nutrition security by making food basket more diverse, safeguarding the existing diversity and achieve sustainable development based on the use of available genetic wealth, promotion and also conservation of these species.

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Figure 1: Fruit and bur of wild fagaceous nuts found in the mild-tropical forest of Kyrdemkulai, Meghalaya (Devi et al., 2022)

Figure 2: Branch and leaf of wild fagaceous nuts found in the mild-tropical forest of Kyrdemkulai, Meghalaya (L-R): Castanopsis perpurella, Castanopsis tribuloides, Lithocarpus fenestratus, Castanopsis indica (Devi et al., 2022)

Esophageal Cancer in Northeast India: A Comprehensive Review of Risk Factors, Diagnosis, and Therapeutic Approaches

Paridisha Das, Rajkumar Deori, Elisha T. Sangma, Sumit Kar, Gajendra Kumar Mourya,
Department of Biomedical Engineering, North-Eastern Hill University, Umshing Mawkynroh, Shillong, Meghalaya-793022, INDIA

Abstract

Esophageal cancer, a significant health concern worldwide, particularly affects regions such as India, where its incidence is notably high in the northeastern states. This malignancy primarily manifests in two forms: squamous cell carcinoma and adenocarcinoma. Early diagnosis is crucial for effective treatment and typically involves a combination of endoscopy ultrasound, biopsy, and imaging techniques such as CT and PET scans. The available treatments for cancer differ based on the cancer's stage and can include radiation therapy, chemotherapy, and targeted therapies. Essential steps, however, are preventative; they are aimed at minimizing risk factors such as alcohol and tobacco use, better dietary practices, and sound environmental health by mitigating genetic predisposition. Public health initiatives aimed at raising awareness and promoting regular screenings are essential to reduce the incidence and improve the outcomes of esophageal cancer.

Keywords: Esophageal cancer, Esophageal cancer staging, squamous cell carcinoma, adenocarcinoma, TNM stages.

Introduction

Esophageal cancer is the eighth most common cancer types found in the world and is becoming increasingly prevalent, particularly the adenocarcinoma type. The incidence of this cancer varies across regions. In high Human Development Index countries, such as most Western nations, fewer people overall develop esophageal cancer but more cases of adenocarcinoma are diagnosed. Countries like India that have a lower HDI have a higher overall incidence of esophageal cancer and most of those very new cases are as squamous cell carcinoma (SCC). An estimated 47,000 new cases and 42,000 deaths due to esophageal cancer reported in each year in India, with males being more affected than females. The northeastern part of India experiences especially high rates of this cancer(Sharma, 2009).

Esophagus cancer, a malignancy occurring in the esophagus, which is the tube connecting the throat to the stomach, has become a significant health concern in India, and it primarily manifests as squamous cell carcinoma, the kind of cancer that arises in the flat cell-lining in the part of the esophagus as shown in figure 1, and adenocarcinoma in our body, which arises in the glandular cells. This cancer has a higher incidence in certain regions, particularly in the northeastern states like Assam, Meghalaya, Mizoram, and Nagaland (Huang, 2013) , and parts of southern India, such as Tamil Nadu and Kerala,

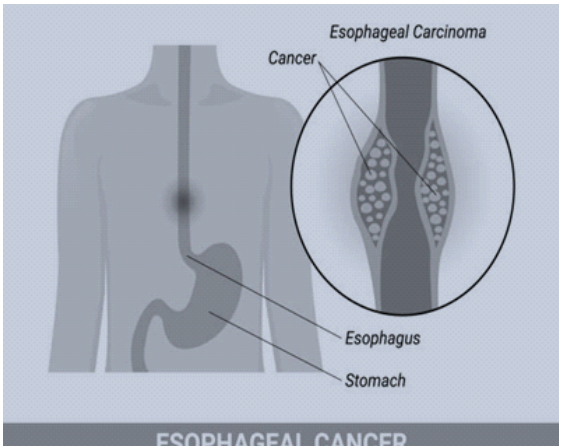

Figure 1: Esophageal Carcinoma

where the rates are substantially higher than the national average. Several factors contribute to this heightened incidence, including lifestyle and dietary habits like high consumption of tobacco and alcohol, the traditional practice of chewing betel quid with tobacco, nutritional deficiencies, and consumption of very hot beverages and foods. Additionally, environmental and genetic factors, such as chronic irritation from gastroesophageal reflux disease (GERD), obesity, certain genetic predispositions, and contamination of drinking water with carcinogenic substances like nitrates and nitrosamines, also play significant roles (Visser et al., 1995).

The pathogenesis of squamous cell carcinoma (SCC)

Figure 2: Squamous cell carcinoma (SCC)

The pathogenesis of Squamous cell carcinoma (SCC) cancer of the esophagus is multi-causal, multistep, and multifactorial, comprising genetic, environmental, and lifestyle factors. Among the most paramount involves smoking in combination with heavy alcohol use, which is widely recognized to be a significant risk factor in development of esophageal SCC (Lu et al., 2016). Carcinogens present in tobacco smoke and alcohol can directly damage the DNA of esophageal cells as shown in figure 2, initiating the cascade of events leading to cancer formation (Wren, 2002). Furthermore, dietary habits play a crucial role, with a higher risk of SCC being connected with a lower intake of fruit and vegetables and a higher intake of processed and smoked foods (Visser et al., 1995) (Huang, 2013). These dietary patterns may result in nutritional deficiencies, including deficiencies in essential vitamins and minerals crucial for maintaining healthy esophageal tissue. Chronic irritation and inflammation of the esophageal mucosa are central to SCC pathogenesis, often stemming from conditions such as gastroesophageal reflux disease (GERD), repeated exposure to hot beverages or food, or ingestion of caustic substances. Prolonged inflammation promotes cell proliferation and can facilitate the development of SCC. Genetic susceptibility is also implicated, although the specific genes involved remain incompletely understood. Certain genetic variations may predispose individuals to esophageal cancer by influencing processes such as DNA repair, cell cycle regulation, and immune response. Human papillomavirus (HPV) infection with high-risk strains, including HPV-16 and HPV-18, has been associated with the development of SCC (Wren, 2002). HPV infection may cause premalignant lesions in the esophagus epithelium. Exposure to environmental carcinogens such as nitrosamines, found in tobacco smoke, smoked and cured meats, and some alcoholic beverages, further increases SCC risk by inducing DNA damage and promoting tumor formation in the esophagus (Patra, 2005). This intricate interplay of factors underscores the complexity of SCC pathogenesis and highlights the importance of comprehensive approaches to prevention and treatment strategies for this aggressive form of cancer.

The pathogenesis of adenocarcinoma

The pathogenesis of adenocarcinoma of the esophagus is a multifaceted process involving a complex interplay of genetic, environmental, and lifestyle factors. Barrett's esophagus, a well-known precursor condition to adenocarcinoma, is defined by the intestinal metaplasia-containing columnar epithelium that replaces normal squamous epithelium as shown in

figure 3 (Dang, 2017). The primary cause of gastroesophageal reflux disease (GERD) is chronic exposure of the esophagus mucosa to stomach acid and bile reflux. The acidic environment in the lower esophagus induced by GERD can lead to chronic inflammation, cellular damage, and genetic mutations, all of which predispose to carcinogenesis. Obesity is another significant risk factor, as adipose tissue produces inflammatory cytokines and hormones that can promote tumor growth and angiogenesis. Tobacco smoking, although more commonly associated with squamous cell carcinoma, has also been implicated in the development of adenocarcinoma, likely through direct damage to esophageal cells by smoking-related carcinogens (Brenner, 2011). The dietary practices that have been associated with adenocarcinoma increased risk comprise excessive intake of processed foods, including red meat and high-saturated fat foods, which are also possible factors contributing to obesity and metabolic syndrome. While Helicobacter pylori infection is mainly linked to gastric ulcers and gastric cancer, it has also been proposed as a possible risk factor for distal esophageal adenocarcinoma via altering gastric pH and inflammation (Dang, 2017). A family history of stomach or esophageal cancer raises the chance of adenocarcinoma, suggesting that genetic susceptibility may possibly be involved. Understanding the intricate interactions between these factors is crucial for elucidating the pathogenesis of adenocarcinoma of the esophagus and developing targeted prevention and treatment strategies for this aggressive malignancy (Visser et al., 1995).

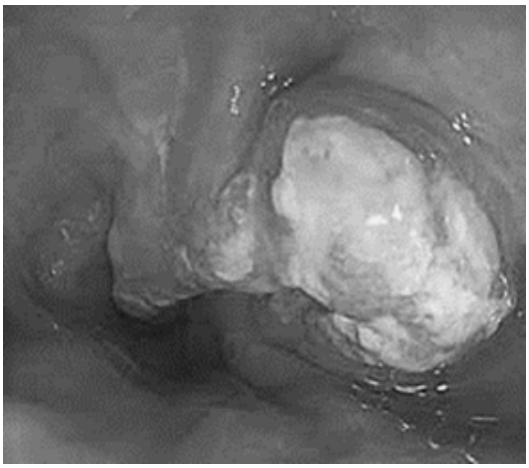

Figure 3: Adenocarcinoma of the esophagus

Routes of esophageal cancer spread

Esophageal cancer's metastatic pathways encompass a multifaceted journey through the body, presenting a complex array of challenges for both diagnosis and treatment. Locally, the disease manifests through the invasion of nearby tissues and structures, a process characterized by the penetration of cancerous cells into the layers of the esophageal wall. Beginning with the mucosa—the innermost layer—and progressing through the submucosa, muscularis propria, and adventitia, the cancer cells infiltrate the surrounding structures, including adjacent organs such as the trachea, bronchi, and aorta. This local invasion frequently results in incapacitating symptoms as discomfort, coughing, hoarseness, and dysphagia, which have a major negative influence on the patient's quality of life (Brenner, 2011).Lymphatic spread stands as a common avenue for esophageal cancer dissemination, with cancer cells utilizing the intricate network of lymphatic vessels to migrate to nearby lymph nodes. These lymph nodes, situated in regions like the mediastinum, abdomen, and supraclavicular regions, serve as vital checkpoints for disease staging and prognostication (Dang, 2017). Treatment planning and patient outcomes are significantly impacted by the existence or absence of lymph node metastases, which influences choices about the degree of surgical resection and the need for adjuvant therapy. When the disease reaches an advanced stage, cancer cells can spread hematogenously, which is when they travel through the circulation to distant organs all throughout the body. The liver, lungs, bones, and brain represent frequent sites of hematogenous metastasis in esophageal cancer, each presenting unique challenges in terms of treatment and management. Metastatic disease burden in these distant organs often correlates with a poorer prognosis and diminished treatment response,

necessitating a comprehensive approach to therapy tailored to the individual patient's needs (Brenner, 2011).

Transcoelomic spread, though less common, poses a notable risk for esophageal cancer progression, particularly in cases involving advanced-stage disease. Circumferential spread is laterally directed dissemination of cancer cells through the peritoneal or pleural cavities, which results in the involvement of peritoneal or pleural metastases. Patients may present with symptoms such as abdominal pain, ascites, and pleural effusion, indicative of advanced disease and necessitating prompt evaluation and intervention (Brenner, 2011).

Moreover, inadvertent dissemination of cancer cells may occur during surgical procedures or endoscopic interventions, resulting in the seeding of tumor cells at distant sites within the abdomen or chest cavity. This phenomenon, known as implantation metastasis, underscores the importance of meticulous surgical technique and perioperative management to minimize the risk of disease recurrence and optimize patient outcomes.

Staging of esophageal cancer

Staging of esophageal cancer is an important procedure that determines the disease's extent by evaluating a number of variables, such as size of the tumor, involvement of lymph node, and the existence of distant metastases. The TNM staging system is the staging method most frequently employed for esophageal cancer (Reed et al., 2005). It classifies tumors as shown in the figure 4 according to the following criterions:

1. **Tumor (T) Stage:**
   - T0: No sign of the primary tumor.
   - Tis: Carcinoma in situ is an epithelium-confined early-stage malignancy.
   - T1: A tumor invades the submucosa, muscularis mucosae, or lamina propria.
   - T2: The muscularis propria is invaded by the tumor.
   - T3: The tumor enters the adventitia by passing through the muscularis propria.
   - T4: The tumor invades distant organs (T4b) or nearby structures (T4a).

2. **Lymph Node (N) Stage:**
   - N0: No metastases of lymph nodes in the region.
   - N1: One or two regional lymph nodes have metastasized.
   - N2: Three to six regional lymph nodes show metastases.
   - N3: Regional lymph node metastases in seven or more

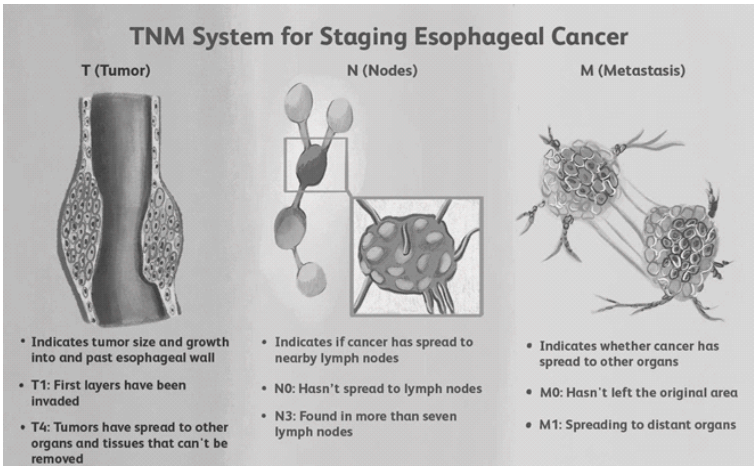

Figure 4: showing TNM staging of Esophageal Cancer, source:

3. **Metastasis (M) Stage:**
   - M0: No metastases in the distant.
   - M1: Distant metastases to the brain, liver, lungs, or bones

T stage of esophageal cancer

A crucial component of the TNM staging system, the T stage of esophageal cancer indicates the degree of tumor invasion based on the tumor's size and behavior both inside and outside the esophagus wall. The cancer is relatively small and limited to the epithelium, the innermost layer of the esophagus, at its first stage, known as Tis (carcinoma in situ). The tumor grows until it reaches T1, at which point it penetrates deeper layers while staying inside the esophageal wall. T1a tumors are smaller than T1b tumors, typically extending less than 2 cm, and they infiltrate the lamina propria or muscularis mucosae. In the T2 stage, the tumor grows larger (typically around 2-5 cm) and invades the muscularis propria, the thick muscle layer responsible for esophageal peristalsis, indicating deeper penetration while still contained within the esophageal wall (Rice, 2005). T3 stage tumors, which frequently measure more than 5 cm, demonstrate considerable local invasion but have not yet spread to neighbouring organs. They do this by piercing the muscularis propria and entering the adventitia, the outer layer of connective tissue (Bunker et al., 2019). At the most advanced T4 stage, the tumor size varies but is generally large and extensive; T4b cancers enter vital, irresectable structures like the aorta, trachea, or spine, whereas T4a tumors invade adjacent, potentially resectable regions like the pleura, pericardium, or diaphragm. Determining the best course of treatment and forecasting patient outcomes for esophageal cancer require an understanding of the T stage, which indicates the size and invasiveness of the tumor.

N stage of esophageal cancer

The degree of regional lymph node involvement is evaluated by the N stage in the TNM staging system for esophageal cancer, which has a substantial influence on treatment choices and prognosis. It is classified as N0, indicating no regional lymph node metastasis, which suggests a better prognosis and less extensive treatment focused on the primary tumor (Rice, 2005). N1 indicates that the cancer has spread to one or two regional lymph nodes and usually calls for a combination of radiation, chemotherapy, and surgery. N2 denotes three to six regional lymph node metastases, indicating a more advanced stage of the illness requiring aggressive, multimodal treatment strategies. N3, the most advanced stage of lymph nodes, is characterized by metastases in seven or more regional lymph nodes (Meyers et al., 2005). This indicates a bad prognosis and widespread dissemination of the disease, which frequently necessitates intensive systemic therapy. Accurate assessment of lymph node involvement through imaging techniques such as CT scans, PET scans, and endoscopic ultrasound is crucial for determining the appropriate treatment strategy and improving patient outcomes (Peters et al., 1999).

M stage of esophageal cancer

The presence or absence of distant metastasis is described by the M stage in the TNM staging system for esophageal cancer as shown in figure 5, which is important for deciding on the course of treatment and prognosis. The status M0 denotes the absence of distant metastases, signifying that the cancer is limited to the main tumor site and nearby lymph nodes. This typically allows for a focus on local control through surgery, chemotherapy, and radiation therapy, with a generally more favourable prognosis. The presence of distant metastasis, or the

spread of cancer to other bodily regions such the liver, lungs, bone Distant dissemination of the malignant tumor to secondary sites including the liver, lungs, and bones, or distant lymph nodes, is indicated by the M1 code (Rice, 2005). This stage reflects a more advanced disease with a less favourable prognosis, often requiring systemic therapies like chemotherapy, targeted therapy, or immunotherapy to manage the spread and alleviate symptoms (Meyers et al., 2005). The treatment goal in M1 cases often shifts from curative to palliative, emphasizing quality of life and survival extension. Accurate assessment of the M stage through imaging techniques such as PET scans, CT scans, and MRI is essential for comprehensive staging and effective treatment planning (Peters et al., 1999).

These factors are used to determine the overall stage of esophageal cancer, which goes from stage 0 (carcinoma in situ) to stage IV (advanced disease with distant metastasis) (Rice, 2005). The severity and prognosis vary based on the stage:

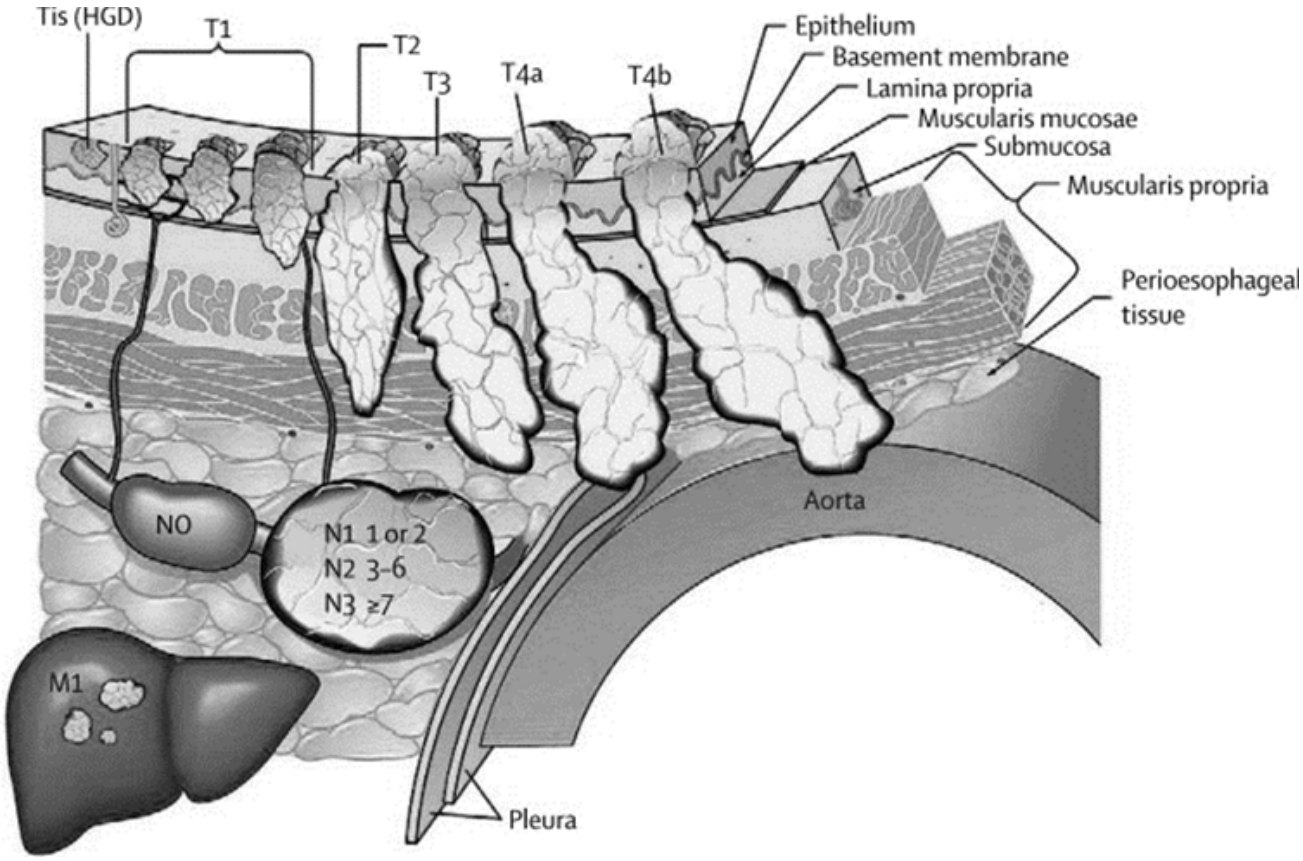

Figure 5: TNM staging system for esophageal cancer

1 Stage zero (Tis, N0, M0): Epithelium-confined early cancer.
2 Stage 1 (T1, N0, M0): The cancer has progressed to deeper esophageal layers, but it hasn't reached distant or lymph node locations.

- Stage IA (N0, M0, T1a).
- Stage IB (N0, M0, T1b).

3 Stage II (N0, M0, or T2 or T3): Cancer has not yet moved to neighbouring lymph nodes or far-off locations; instead, it has grown into the muscle layer or through the muscle layer to the outer layer (Rice, 2005).

- Stage IIA (T2, N0, M0)
- Stage IIB (T3, N0, M0) or (T1-T2, N1, M0)

4 Stage III(T3-T4a, N0-N1, M0): Cancer has invaded the adventitia or neighbouring structures and/or the regional lymph nodes but has not spread to distant sites.

- Stage IIIA (T4a, N0, M0) or (T3, N1, M0)
- Stage IIIB: T4a, N1, M0 or T1-T2, N2, M0
- Stage IIIC(T3-T4a, N2, M0) or(T4b, N0-N2, M0)

5 Stage IV (Any T, Any N, M1): Tumor has spread to distant organs (Rice, 2005)

The earliest stage, or Stage 0, also called carcinoma in situ, is a stage where the cancer cells are confined to the innermost cell layers of the esophagus and have a high five-year survival rate of approximately 90%. Stage I The cancer has now grown into the deeper layers of the esophagus but not into lymph nodes or distant sites; its five-year survival rate is 40-60%. In Stage II, it has invaded adjacent tissues or organs or spread to adjacent lymph nodes and the five-year survival rate becomes 20-30%. Stage III means that it has extensively spread to nearby lymph nodes and tissues but not to distant organs and its five-year survival rate is less than 20% (Meyers et al., 2005). Finally, Stage IV means the cancer has spread into distant organs; for this stage five-year survival rate is less than 5%. All these stages show how crucial esophageal cancer identification and treatment in their early stages would be since its earlier stages experience better prognosis in general and, hence treatment results Kelsen et al., 1994).

The staging of esophageal cancer will, in major ways, inform appropriate treatment. Early cancers can best be treated with surgery, while advanced diseases may call for all or any of the following: surgery, chemotherapy, radiation therapy, and targeted therapy. Periodic imaging tests, such as CT scans, PET, and endoscopic ultrasound help monitor the extent of the disease over time and its response to treatment (Bunker et al., 2019).

Diagnosis procedure of esophagus cancer

Early diagnosis of esophageal cancer is very important because it provides greater and more effective treatment options and higher survival rates. Esophageal cancer diagnosed during the early stages is more treatable and even curable. In such a situation, the patient has more options opened for them in terms of treatment and can even opt for less invasive procedures like surgery or radiation therapy. It also prevents the cancer from getting spread to other parts of the body, thereby making the treatment even more difficult. In addition, an early diagnosis reduces treatment complications and allows a better quality of life for the patient (Enzinger et al., 2003). That is why regular screenings are important for people who have risk factors for esophageal cancer, including those with smoking history and those suffering from chronic acid reflux. Medical consult is also important if symptoms occur. Staging and diagnosis of esophageal cancer require a combination of clinical evaluation of medical history, physical examination, imaging tests, endoscopic procedures, and biopsy. The following is an overview of each diagnostic procedure:

1. Physical examination and medical history:

The healthcare provider gathers information about the patient's symptoms, medical history, risk factors (such as smoking, alcohol consumption, and family history of cancer), and any other relevant factors. A physical examination may be conducted to assess for signs of esophageal cancer as shown in figure 6, such as difficulty swallowing (dysphagia), unintentional weight loss, and enlarged lymph nodes.

2. Imaging Tests:

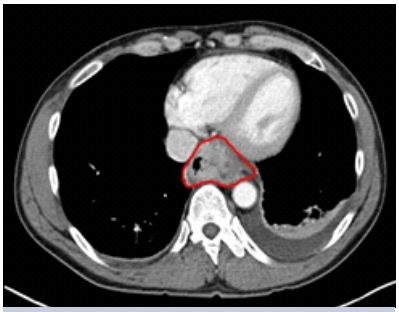

Figure 6: Positron emission tomography (PET) scan showing affected area of esophageal cancer

Barium Swallow: In this test, the patient drinks a barium solution, which covers the esophageal lining and improves visibility on X-ray pictures. Barium swallow can reveal abnormalities such as strictures (narrowing), ulcers, or tumors in the esophagus.

CT Scan: A computed tomography (CT) scan uses X-rays to create detailed cross-sectional images of the chest and abdomen. CT scans can detect the size and location of esophageal tumors, as well as any spread to nearby lymph nodes or distant organs(Lu et al., 2016).

PET Scan: Positron emission tomography (PET) scans involve injecting a radioactive tracer into the bloodstream, which is taken up by rapidly dividing cells, such as cancer cells. PET scans can help detect the spread of esophageal cancer to distant sites in the body(Wren, 2002).

Magnetic Resonance Imaging (MRI) is a crucial tool for diagnosing esophageal cancer, providing detailed images of the esophagus and surrounding structures. MRI can detect tumors, assess their size and extent, and determine the depth of invasion into the esophageal wall. It also evaluates lymph node involvement and distant metastases, essential for accurate staging and prognosis. MRI guides biopsy procedures and informs treatment planning by offering precise information about tumor characteristics and spread, making it invaluable in the comprehensive management of esophageal cancer.

3. Endoscopic Procedures:

Esophagogastroduodenoscopy (EGD): Also known as upper endoscopy, EGD involves inserting a thin, flexible tube with a camera (endoscope) through the mouth and into the esophagus, stomach, and duodenum. This allows the healthcare provider to directly visualize the esophageal lining, identify any abnormalities, and take tissue samples (biopsies) for further evaluation (Ilson, 2011).

Endoscopic Ultrasound (EUS): EUS combines endoscopy with ultrasound technology to produce detailed images of the esophageal wall layers and surrounding structures. EUS can help assess the depth of tumor invasion into the esophageal wall and nearby lymph nodes, guiding treatment decisions (Karpeh, 1998).

4. Biopsy:

During endoscopy or EUS, tissue samples (biopsies) are collected from suspicious areas within the esophagus. These samples are then examined under a microscope by a pathologist to confirm the presence of cancer cells and determine the histological type and grade of the tumor.

These diagnostic techniques are essential for correctly identifying esophageal cancer, coordinating the disease's stage, and directing therapeutic choices. For individuals with esophageal cancer, early identification and detection are essential to better results.

Treatment procedure of esophagus cancer

Treatment for esophageal cancer is crucial for improving survival rates and enhancing the

quality of life for patients. Effective treatment, especially when initiated early, can eliminate or reduce tumors, significantly increasing the chances of a cure or prolonged life. It alleviates severe symptoms like difficulty swallowing, pain, and weight loss, enabling patients to maintain proper nutrition and daily activities. It is specifically critical to treat early to avoid metastasis to the rest of the body, because such metastasized cancer is very problematic to control and the general prognosis for metastatic cancer is usually weak. Treatment also helps preserve the normal function of the esophagus, ensuring patients can continue to swallow and digest food effectively. Beyond direct medical benefit, to improve quality of life, treatment is available that may range from pain management to nutritional support and psychological counselling to address the patient's needs in a holistic or multidimensional fashion. Medical procedures for esophageal cancer are used in combination depending on the stage of the disease and its peculiarities and the patient's general state of health (Kelsen, 1994). The following are the basic treatment methods:

1. **Surgery:**

- **Esophagectomy:** The primary surgical procedure for esophageal cancer, where part or all of the esophagus is removed. Open surgery, minimally invasive procedures, or robotic surgery can be used to complete it. The stomach is often pulled up to replace the removed esophagus, or a segment of the intestine is used.
- **Endoscopic Resection:** For very early-stage cancers, endoscopic mucosal resection (EMR) or endoscopic submucosal dissection (ESD) can remove the cancerous tissue through an endoscope without needing open surgery.

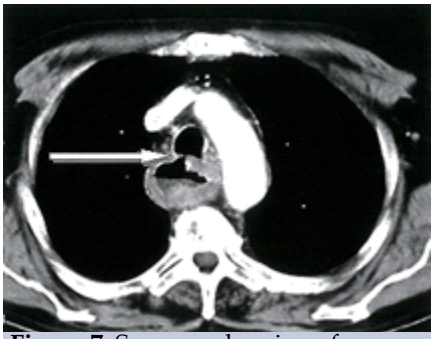

Figure 7: Surgery planning of esophageal cancer from PET-CT scan

2. **Radiation therapy:**

- **External Beam Radiation Therapy (EBRT):** Targets and destroys cancer cells with high-energy beams. It can be used either before surgery (neoadjuvant therapy) to decrease tumors or after surgery (adjuvant therapy) to eliminate any leftover cancer cells. It is frequently coupled with chemotherapy (chemoradiation) (van Hagen, N. et al., 2012) .

3. **Chemotherapy:**

- **Neoadjuvant chemotherapy:** given before to surgery with the goal of shrinking tumors to facilitate their surgical removal (van Hagen, N. et al., 2012).
- **Adjuvant Chemotherapy:** administered following surgery to eradicate residual cancer cells and lower the likelihood of recurrence.
- **Chemoradiation:** Combines chemotherapy and radiation therapy to enhance the effectiveness of both treatments, commonly used for locally advanced esophageal cancer (van Hagen, N. et al., 2012) .

4. **Targeted Therapy:**

- Involves drugs that specifically target molecular abnormalities in cancer cells, such as HER2-positive esophageal cancer. Examples include trastuzumab (Herceptin) and ramucirumab (Cyramza).

5. Immunotherapy:

- Makes use of medications to aid the immune system's ability to identify and combat cancer cells. Certain kinds of esophageal cancer are treated with immune checkpoint inhibitors, such as pembrolizumab (Keytruda) and nivolumab (Opdivo) (Ilson, 2010).

6. Palliative Care:

- Targeted at symptom relief and quality of life enhancement for individuals suffering from advanced esophageal cancer. In order to treat dysphagia (difficulty swallowing), palliative radiation or chemotherapy may be used to shrink the tumor and improve symptoms. Stent placement is one method of doing this

7. Nutritional Support:

- Essential for patients who have difficulty swallowing or maintaining adequate nutrition. This can involve dietary modifications, feeding tubes, or intravenous nutrition to ensure the patient receives necessary nutrients (Anderson, 2010).

Discussion

Assam, Meghalaya, Mizoram, Nagaland, and Tripura are among the states in northeastern India that have some of the highest incidence rates of esophageal cancer in the nation. This elevated prevalence is largely attributed to entrenched traditional lifestyle habits prevalent in these areas, prominently including the widespread consumption of betel nuts and tobacco products like gutka and smoking. According to data from Population-Based Cancer Registry (PBCR) reports, Assam, particularly in regions such as Kamrup Urban district, registers notably high incidence rates of esophageal cancer, with an Age-Standardized Incidence Rate (ASIR) ranging from approximately 30 to 40 cases per 100,000 population annually. Similarly, Mizoram, characterized by prevalent betel nut and tobacco use, records ASIR figures as high as 60 to 70 cases per 100,000 population, particularly among men. Even in states like Nagaland and Tripura, significant numbers of esophageal cancer cases are reported, reflecting similar cultural practices. While the specific data may vary, these statistics underscore the substantial impact of traditional lifestyle habits on the incidence of esophageal cancer in the northeastern region, highlighting the urgent need for targeted public health interventions to address these risk factors and mitigate the disease burden (Indian Council of Medical Research).

The data from Population-Based Cancer Registries (PBCR) in northeastern states consistently as shown in the figure 8 reveals alarmingly higher Age-Standardized Incidence Rates (ASIR) of esophageal cancer compared to other regions of India. For instance, Mizoram exhibits a particularly concerning ASIR for esophageal cancer, reaching as high as 71.3 per 100,000 for men, significantly surpassing the national average. This disparity can be attributed to prevalent lifestyle and dietary habits ingrained in these communities. Though both betel nut and tobacco (gutka) are known carcinogens, over 50% of people in these areas frequently consume them despite the International Agency for Research on Cancer's (IARC) classification of both as carcinogenic (International Agency for Research on Cancer, 2004).

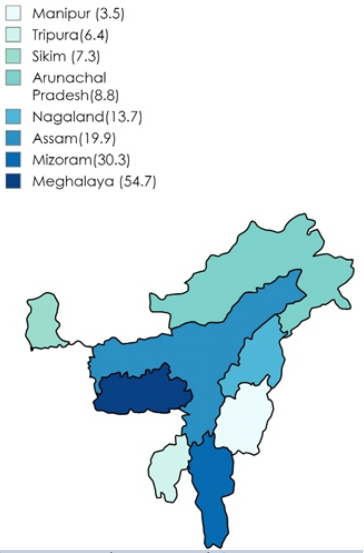

Figure 8: Population-Based Cancer Registries (PBCR) in northeastern states consistently

A survey conducted in Nagaland revealed that nearly 60% of the male population smokes, with a significant proportion also using smokeless tobacco. The detrimental impact of these habits is underscored by case-control studies, such as the one conducted in Assam, which indicated a four-fold increased risk of developing esophageal cancer among individuals who chew betel nut with tobacco compared to non-users. Similar findings have been corroborated in Mizoram and Nagaland, highlighting the consistent and pervasive influence of these carcinogenic habits on the heightened incidence of esophageal cancer in the northeastern states of India (Singhi, 2016).

Table 1

STATE	REGISTRY	Percent MV	Percent DCO	Per cent O and U
Arunachal Pradesh	West Arunachal	94.1	0.1	2.6
	Papumpare district	95.5	0.0	2.3
	Pasighat	88.3	1.6	7.4
Assam	Cachar district	82.8	3.0	12.2
	Dibrugarh district	78.7	9.8	4.9
	Kamrup Urban	81.1	8.2	5.4
Manipur	Manipur state	93.2	0.6	4.2
	Imphal west district	94.2	0.5	4.4
Meghalaya	Meghalaya State	86.8	9.9	8.3
	East Khasi Hills district	89.7	7.0	6.3
Mizoram	Mizoram State	85.2	5.0	10.0
	Aizawl district	88.0	2.6	7.5
Nagaland	Nagaland	96.6	0.5	3.3
Sikkim	Sikkim	88.1	4.8	8.3
Tripura	Tripura State	93.8	0.1	8.1

Table 1Source: The percentages of cases with microscopically confirmed cases (MV), "only" cases recorded on death certificates (DCO), and relative proportions of cancers classified as "other and unspecified sites (O and U)" are represented by the percentages O and U, MV, and DCO

For the years 2012–2016, all locations' data quality metrics from the population-based cancer registries in the Northeast Numerous inferences can be made in light of the information supplied on data quality indicators from population-based cancer registries in the Northeast for the years 2012–2016. Firstly, there is notable variation in data quality across different states and districts within the region. For instance, Arunachal Pradesh exhibits generally high data quality with West Arunachal and High percentages of microscopically verified cases (MV) and low percentages of death certificate-only cases (DCO) are observed in the Papumpare district. Conversely, Assam's Cachar and Dibrugarh districts demonstrate comparatively lower data quality, with higher percentages of DCO cases. Furthermore, while some states like Nagaland and Manipur display high percentages of MV cases, others like Meghalaya and Mizoram have higher proportions of DCO cases (Miranda, 2013) (Singhal et al., 2016). This suggests disparities in the diagnostic and reporting practices among different regions. Additionally, the relatively high percentages of "other and unspecified sites" (O and U) cases in several regions,

such as Pasighat in Arunachal Pradesh and Kamrup Urban in Assam, indicate potential challenges in accurately categorizing and reporting cancer cases, which could impact the reliability of cancer incidence data in these areas (Thapa, 2016).

Table II

Cancer centres in the north-east States of India

state	Population	Cancer treating facilities	Radiotherapy facilities	Cancer Patient welfare schemes	Palliative care centres
Arunachal Pradesh	1,383,727	1	1	0	0
Assam	31,205,576	6	6	9	8
Manipur	2,855,794	1	0	0	1
Meghalaya	2,966,889	7	1	0	1
Mizoram	1,097,206	5	1	3	2
Nagaland	1,978,502	6	1	0	1
Sikkim	610,577	1	0	0	1
Tripura	3,673,917	1	1	0	1

The north-eastern states of India exhibit significant variation in cancer-related health facilities, with Assam leading in resources, while others like Arunachal Pradesh, Manipur, and Sikkim lag behind. To maximize the existing infrastructure, strategies include centralizing treatment in states with better facilities, deploying mobile radiotherapy units, and forming public-private partnerships to increase access. Awareness campaigns and policy advocacy can introduce welfare schemes where lacking. Expanding palliative care through training and home-based services, along with fostering inter-state collaboration and resource sharing, are crucial. Community engagement, through support groups and trained health workers, can provide essential support and early detection. These coordinated efforts can enhance healthcare delivery and equity across the region. (Shroff et al., 2013)

Cultural practices deeply rooted in the northeastern states of India, such as the widespread use of betel nut mixed with tobacco and smoking, significantly contribute to the region's elevated risk of esophageal cancer. From childhood to adulthood, chewing betel nut and tobacco is a prevalent tradition ingrained in social and cultural practices, perpetuating exposure to carcinogens over extended periods. Similarly, smoking, including the consumption of locally available tobacco products, is deeply embedded in social rituals and daily life, further increasing tobacco exposure levels (Verma, 2015). The health impacts of these habits are profound, particularly concerning esophageal cancer. The carcinogens present in betel nut and tobacco directly harm the esophageal lining, causing mutations that pave the way for cancer development. Chronic irritation and inflammation resulting from these substances are critical factors in the pathogenesis of esophageal cancer. Additionally, Nutritional deficiencies are rampant in these regions because of inadequate sustenance of fresh foods, which can predispose to the risk. A deficiency of vital micronutrients weakens the ability of the human body to repair DNA damage, making the body more prone to cancer. Public awareness and education on such cultural practices and health impacts are the need of the hour so that with lifestyle change, the risk of esophageal cancer can be lessened in the northeastern states of India (Verma, 2015) (Bhattacharyya, 2015).

To address the significant health challenges posed by betel nut and tobacco usage in the northeastern states of India, targeted public health interventions are imperative. Firstly,

comprehensive awareness campaigns must be initiated to educate individuals about the detrimental health effects associated with the consumption of betel nut and tobacco. These campaigns should employ culturally appropriate messaging and engage with communities through various platforms, including schools, workplaces, and community gatherings. By raising awareness about the risks and promoting healthier lifestyle choices, such initiatives can help curb the prevalence of these harmful habits. Implementing screening programs for early detection of esophageal cancer is crucial in improving treatment outcomes and reducing mortality rates. Regular endoscopic examinations, especially among high-risk individuals, can facilitate the early diagnosis of cancerous lesions or precancerous conditions, enabling prompt intervention and potentially life-saving treatments. Alongside screening efforts, raising awareness about the early symptoms of esophageal cancer, such as difficulty swallowing, persistent cough, and unintended weight loss, is essential to encourage individuals to seek medical attention promptly (Thapa, 2016).

The North Eastern region produces a lot of a turmeric product, curcumin. Available varieties are Lackadong and Megha, containing 8.9% curcumin. In earlier studies, it was observed that curcumin inhibited the rapid growth of cancer cells and induced apoptosis in esophageal cancer. It is useful to reduce toxicity to normal tissue during treatment of diseases. Therefore, health education on the risk factors and the symptoms of esophageal cancer with regards to high incidence will be considered. Also, the curcumin available in this region helps in preventive health care (Bunker et al., 2019).

A strict regulation of tobacco products is paramount to curbing their usage in the northeastern states. Enforcing stringent policies on the sale, distribution, and advertising of tobacco products, including gutka and betel nut, can significantly reduce their accessibility and consumption. By implementing measures such as increased taxation, packaging warnings, and bans on tobacco advertising, the government can effectively deter individuals, particularly youth, from initiating or continuing tobacco use. These regulatory efforts have shown promising results in other regions and hold immense potential for mitigating the tobacco epidemic in the northeast (Singhal, 2016) (Sen, 2018).

Conclusion:

Esophageal cancer is staged to understand the extent of disease and predict the treatment's response. Early stages like Stage 0 and I link with higher survival and good prognostication by treatment, as cancer is located in the walls of the esophagus with very limited spreading. As the cancer advances to Stage II and Stage III, the survival rates decrease significantly, reflecting the increased complexity of treatment due to local and regional spread. Stage IV is the most advanced stage, with the poorest prognosis: less than 5% survive for more than five years because of metastasis in organs away from the initial site. This progression underlines the absolute necessity of early identification and intervention for an improvement in the outcomes and survival rates of patients.

Esophagus cancer is a significant concern in the north-eastern region of India, largely due to high rates of tobacco and betel nut consumption, and smoking. Raising awareness about the dangers of these habits is crucial; public health campaigns must educate communities on the risks and promote healthier alternatives. Utilizing existing cancer healthcare facilities effectively is essential; centralized treatment in states like Assam can provide better access to care, while mobile units and telemedicine can extend services to underserved areas. Introducing welfare schemes and expanding palliative care will improve patient support.

Strict enforcement of anti-tobacco laws and community engagement through support groups and health workers are vital steps towards reducing esophagus cancer rates and improving overall health outcomes in the region.

One of the promising avenues for addressing this issue is the abundant availability of curcumin in this region. Curcumin is derived from turmeric, extensively cultivated in the North Eastern region. Notably, the varieties of turmeric grown here, such as the Lackadong and Megha varieties, are known for their high yield and quality, with curcumin content as high as 8.9%. Curcumin has been recognized for its potential anticancer effects. It has been found to interfere with multiple cells signalling pathways, which can modulate cancer development and progression. Specifically, for esophageal cancer, curcumin has been shown to inhibit cell growth and induce apoptosis. Moreover, it has been suggested that curcumin could be used as a natural antioxidant to reduce the toxicity of current therapeutic modalities in a chemo-adjuvant setting while simultaneously targeting different pro-oncogenic pathways. despite the potential benefits of curcumin and its availability, there is a need for increased awareness about esophageal cancer in the North Eastern region of India. The region has a high burden of cancer, but at the time of diagnosis, less than one-third of cases are localized, indicating a lack of early detection. Therefore, efforts should be made to increase awareness about the risk factors, symptoms, and the importance of early detection of esophageal cancer. Additionally, the potential benefits of locally available resources, such as curcumin, should be communicated to the public.

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A Study on the Ethnic Games of AO Nagas and Sumi Nagas of Nagaland

By: Mr. Somnath Chakraborty and Prof. Somenath Bhattacharjee

Ph.D. Research Scholar, Department of Anthropology, Nagaland University, Hqrs: Lumami, Dist. Zunheboto, Nagaland, Pin Code–798627 and Soprts coach of Judo, Nagaland University. Contact: 9862267702 email: somnath_rs2023@nagalanduniversity.ac.in

Professor, Department of Anthropology, Nagaland University, Hqrs: Lumami, Dist. Zunheboto, Nagaland, Pin Code–798627 Contact: 8777796831 (M); email: somenath@nagalanduniversity.ac.in

Abstract:

Games and sports are an essential part of human life. It can be considered as an intangible cultural heritage of a community. The field of sport and culture refers to the values, ceremonies and way of life characteristics of a given group and the place of sport within that way of life. Like the concept of society, the notion of culture is widely used in the sociological, anthropological and historical study of sport. It encourages the researcher and student to consider the meanings, symbols, rituals and power relations at play within any particular cultural setting. Traditional sports and games as a specific part of the global sport system may engender the notion of old, exotic and endangered cultural manifestations, but to some extent that is only the outsider´s view on an extremely widespread and interesting sub-group of sports, which can be analyzed from different perspectives relating to sociological, anthropological or cultural sciences.

Different tribal groups of India also have some of their own traditional games and sports, which reflect their cultural identity and means of recreation and entertainment in leisure time. The Ao Naga and Sumi Naga are two very important Tribal groups Nagaland, primarily dwelling in the Mokokchung and Zunheboto district of Nagaland respectively. They are autochthones of the region and they have multiple traditional cultures of their own and some unique ethnic games and sports as well. In this paper an attempt has been made to focus on the various ethnic games of the Ao Nagas and Sumi Nagas. The concerned people of these villages are very much aware of their folk cultural traditions, particularly of their ethnic games and sports. This paper is an attempt to discuss about their different ethnic games; as well as the significance of such ethnic games among the concerned people, with a special reference to their emerging problems and prospects.

INTRODUCTION

Games and sports are an essential part of human life. It can be considered as an intangible cultural heritage of a community. The field of sport and culture "refers to the values, ceremonies and way of characteristics of a given group and the place of sport within the way of life. Traditional sports and games as a specific part of the global sport system may engender the notion of old, exotic and endangered cultural manifestations, but to some extent that is only the outsider's view on an extremely widespread and interesting sub-group of sports, which can be analysed from different perspectives relating to sociological, anthropological or cultural sciences." (Groll, 2015:7). According to Linaza (2013:2), "Sport is the most universal of cultural pursuits-it is accessible and of interest to all. It is a key part of cultural identity, and a mechanism for the protection and promotion of cultural diversity."

Traditional games are an integral part of one's heritage and cultural tradition. They have a great significance in entire life of a person and have left a mark in the childhood of every

human being who played them. Research endorses that play is the best form of physical activity for children and through traditional game playing children learn about the rules and values of their cultures. (Khalid, 2008:12). Regarding the importance of playing games, on the other hand Kovacevic (2014:9) mentioned that, "Play can be considered a form of behavior, which takes place according to rules, in a specific space and time. Due to its features, play has become the subject of study in different sciences. The interest in the study of play arises in pedagogy, psychology, sociology, ethnology, philosophy, but is also an important segment of art, economy and other areas. That fact confirms the importance of play as a unique phenomenon which accompanies as throughout our lives, from early childhood. There are a large number of games which are meant for different age groups of children and adults. Play gives the child a possibility of active participation and enables development, achieving self-confidence and better relations within the group."

Kovacevic (2014:11) noted that, "Through play, a child develops and communicates with its surroundings. Play is the activity which is different for a child and for adults, because adults consider it as fun in their free time. A child makes its first social contacts by playing with other children and, because of that, play is an important in realizing relations of individuals within a certain group."

Traditional sports and games (TSG) can form the backbone of a community, and UNESCO is driven to protect and promote these sports to further community spirit, bring peoples together and install a sense of pride in a society's cultural roots. Traditional sports and games are part of intangible heritage and a symbol of the cultural diversity of our societies. They are also an efficient means to convey values of solidarity, diversity, inclusiveness and cultural awareness. (Boro,2015:3).

PRESENT STUDY- ITS OBJECTIVE AND METHODOLOGY

Studied Area and The People: The study was done in the Mokokchung and Zunheboto districts of Nagalnd to know about the different ethnic games of the Ao Naga and the Sumi Naga people. Total 100 families were studied and among them 50 families were each from Ao Naga and Sumi Naga. The total population was 612 out of which the population of male was 319 and female was 293. The studied areas were particularly inhabited by the concerned ethnic groups and they used to follow certain traditional customs and behaviour as their unique cultural identity which gets transmitted from generation after generation.

Among the studied families the youths and adults were all associated with different folk cultural performances and ethnic games.

Objectives of the Study: The prime objectives of the study are-

1. To know about the various ethnic games of the AoNagas and the SumiNagas.
2. To understand the significance of ethnic games as a means of recreation and entertainment among the studied people.
3. To find out the significance of traditional wrestling among the concerned people.

Methodology: The study was conducted in Mokokchung and Zunheboto districts of Nagaland. The studied people were belonging to the Ao Naga and Sumi Naga tribal group which were the numerically dominant people of the concerned districts respectively. A pilot survey in the studied area was done during May 2023. Further during the pilot survey it was noticed that, in this settlement the concerned people were associated with their traditional

cultural practices and social norms, in the context of their livelihood. These two major criteria provided the prime emphasis to select the said village as the studied area. The study was conducted among 50 Ao Naga and 50Sumi Naga families, where most of the members were associated with the practices and participation in their different ethnic games. The studied people could easily communicate through Nagamese. Our knowledge of Nagamese enabled to have an intimate interaction with the studied population. In this regard, primary data were collected through filed work, which was conducted from June 2023 to November 2023. There were three divisions of the total field work as follows-

Division-1: Fore mostly, the general observation of the village was done along with the completion of Preliminary Census Schedule (PCS). It was applied to collect the basic demographic aspects of the studied people.

Division-2: Case studies were taken on the concerned families. It was focused on the issues of the origin of their ethnic games, their methods to get played and importance in the livelihood of people.

Division-3: Detailed open structured interviews were taken from the key informant, eldest person of the settlement to know in detail about their ethnic games.

FINDINGS AND DISCUSSIONS

A. Indigenous Games and sports of the Sumi Nagas

1. Angu Kupusu (Spear Kicking): in a traditional Sumi village young youth boys are normally playing this games to show their smartness with a light body. It is also playing in area wise within sumi villages. Spear height approx 6.5 fits to 7 fits. This jump also two types, one is normal jump with both legs, another one jump with volt (gymnastic types).

2. Azuto Kughuna (Shield Jump): Traditionally Sumi nagas are warrior. Before going to an war field, warrior are play this type of games. Through games to practice for war, to jump over the obstacle or stones gadwalls of enemies, bamboo gadwall or over the enemies itself.

3. Aki Kiti (Leg Fight): It is a Sumi contact combat sports involving kicking and blocking with soles. It is a traditional sports originating from the sumi-naga, people of Nagaland. This games play to decide who is the stronger between two. In traditional royal family elder son get the chance to lead the clean. But when another son climes to form another village that time also play this games and prove that he also can lead the group. After wining only he get support from father or leader of the family (Head Gaaou Buraa) with solder for his group and others needful.

4.Awudu Kumugho (Cock Fight): This games pay with single leg(one leg hold by both hand) and pushing by shoulder, when one stand one both leg opponent win directly. This games can play one with one, two with two or group with group. This games basically picking up intelligent youth in the village or clean.

5. Imu no pi sujojo (Delightful games/Singing and playing): A group of people sing and play in deferent types of situation, Like- in war some lose their brother/ some lose their son/ sometime elder brother afraid and surrender but younger brother win the battle and after reaching village younger brother give the proud to his elder brother. In deferent situation deferent types of song and play with each others in groups to express happiness and sadness both time these types of games played.

B. Indigenous Games and sports of the Ao Nagas

1. Mimungalemshishiba (jumping over the fire): In this game, a fire sport is built in the middle of the ground, and the player is expected to jump across the fire. The winner of the game decides through their brilliant performance.

2. Opong Khashishiba (sling shooting): In this game, an item in the form of a target is built, and the players are expected to hit the target using the rubber sling. The first one to hit the target with the sling is declared the winner.

3. Jangzuaputepba (Blowing the trumpet): A traditional blowing trumpet competition was held in Naga villages to revive the dying practice and create awareness among the new generation. The conventional horn is usually made of or shaped like an animal horn, arranged to blow from a hole in the pointed end of it to make the sound. The rudimentary device has a variety of functions in different cultures; however, the common cases of its usage are celebrations and alertness to impending danger. With the advent of modernity, this communication mode handed down through generations is almost waning.

4. Nu tsung shishiba (throwing spears on a target): In this game, a target is built out of banana steam, or any other item, and the players try to hit the target. The first player to hit the target is declared the winner.

5. Au Karat sung nungas emtepba (stilt Bamboo racing): This game uses two bamboo poles as a supporting stand. The players are supposed to stand on the two bamboo poles and use their hands to balance the legs and the body. All the players are given a track to run; the first to outrunthe other players is considered the race's victor.

6. Tekettsu agiali nungtangiter jajaba (walking with elbow): In this game, all players should raise one leg, use one hand to grasp the leg, and hop with one leg. The players here are expected to push each other till the opponents fall out of balance or when both feet touch the ground (like a cock fight).

Games played Both By Men and Women

1. Alem shishitepba (high jump): Three bamboo sticks are placed in this game. Two sticks are kept as poles vertically and one horizontally. The stick acts horizontally as the level meter when a player clears one stage/ level. The stick is raised higher to increase the difficulty. Therefore, the winner is declared if they jump or clear the level the other player fails to do.

2. Asemptebpa (running race): In this game, the rules are the same as in any other running race. There is a specific track, and the distance depends on the rule makers. The players are supposed to run each other out till they reach the finish line. The first person to reach the finish line is declared as the winner.

3. Arratsutepba (Tug of war): In this game, Equal numbers of people are displaced on two sides. A rope made out of tree ariel roots is used. Both groups at opposite ends are expected to pull the ropes from each end. Until one team is completely overpowered by the other, the team that could overpower the other is declared the winner.

4. Jumping over the bamboo pole using a bamboo stick: This game keeps three bamboo poles similar to the high jump as levels/ stages. The players here use another bamboo as support to jump across the bamboo poles. The one that could jump the highest is declared as the winner.

5. Ajushishuba: In this game, all the players take either a beetle tree cover/ bamboo cover. All players climbed an elevated hill and used the covers to sit and slide down the mountain.

Games played by children

1. Five stones: In this game, five stones are placed above each other. Two teams are created: one person to shoot (forms one team) at the rocks and the other players (another team) to rebuild the stones. One team gets the ball to shoot down the stacked rocks while the rest try to rebuild the stones by stacking them above each other. If the single player shoots down all the rocks before the others can rebuild them, they are declared the winner. Similarly, if the group could rebuild the stones before the shooter can shoot down, they win the game.

2. Tokpong: In this game, a bamboo with a hole in the center is carved, and paper balls are chewed and inserted. Another bamboo stick is used to shoot the paper out of the bamboo.

3. Hide and seek: In this game, there is a seeker, and multiple people hide. The seeker gives the people who are to hide a specific time frame in a given space. The seeker's job is to find all the people that are hiding. The game ends when the seekers find all the people that are hiding. If he fails to find the hiders they forfeit the game.

C. Kene- The Traditional Naga Wrestling

Naga Wrestling is one of the oldest traditional Indian sports. This is a form of wrestling in India that was invented and popularized in the Indian state of Nagaland. The people of Nagaland enjoy playing and watching the game very much, and the authorities organize regular inter-village wrestling championships in the state, every year. The game has later gained popularity in the national level in India also and in the modern times, national championships are being organized on a regular basis.

In Naga Wrestling, the participants begin by catching the other contestant's waist belt. Once the referee signals the start of a game, the two competitors try their level best to discard each other. The wrestlers can do it by using a number of tricks. They can use their legs and also muscular force. However, though holding the opponent's leg with using hands is not permissible in Naga Wrestling, one can use his hands to hold the other parts of the opponent's body, beginning from the waist and going further up. The wrestler, who becomes successful to throw the opponent to the ground, is declared as the winner of the match. However, the wrestler must ensure that the trunk of the opponent has touched the ground.

The competitors in a Naga Wrestling match should always be careful that his trunk does not touch the ground. According to the rules of the game, if a player is in a kneeling position with his knees and hand in contact with the ground, he loses the bout. A Naga Wrestling match comprises three rounds to decide the winner. The Naga Wrestling is quite famous among the tribes of Nagaland, especially among the tribes like Angami, Chakhesang, Zeliang, Rengma and Mao. The people of Nagaland has also been organizing a Wrestling Championship since 1961, to promote peace and unity among the people. The Nagaland Wrestling Association (NWA) is working relentlessly to preserve and promote Naga Wrestling, and it is also affiliated to the Wrestling Federation of India (WFI). In 1965, the first organized wrestling meet was initiated by the Federal Government of Nagaland. It was later reinforced with the formation of the Naga Wrestling Board in 1969 and under its aegis the first Naga Wrestling Championship was held on 20 May 1971.

Naga wrestling is by far the highest grossing sporting event in the State of Nagaland. The traditional grappling sport, an integral part of the Tenyimias since 'time immemorial,' is loved by both young and old, and men and women alike. The Naga wrestling tournament organized by the Nagaland Wrestling Association (NWA) nets an astounding total of more than Rs 70 lakhs per tournament, making it the highest revenue generating sports event in the state. Football events, which also dominate the sporting calendar in Nagaland, meanwhile net about Rs 10-15 lakhs per tournament, which is not even half of the revenue generated from wrestling events. Naga wrestling also carries the highest prize money among all other sports events in the state level.

History of organized wrestling

According to the records of the Naga Wrestling Association (NWA), though wrestling is as old as Naga history, organized wrestling is a recent phenomenon. It was learnt that the Federal Government of Nagaland (FGN) under Japfu state initiated the wrestling meet to provide a platform to the wrestlers of various villages of the Tenyimia Nagas, and also to honour their republic day functions in the years 1965-67. In 1965, the first organized wrestling meet was initiated by the Federal Government of Nagaland. It was later reinforced with the formation of the Naga Wrestling Board in 1969 and under its aegis the first Naga Wrestling Championship was held on 20 May 1971.

The first Naga wrestling tournament was held on May 20, 1971 with no individual championship but multiple champions. It was in the year 1972 that individual championship was introduced, which later became a tradition. Recognizing the tremendous logistical pressure to organize such a mega event annually, the decision to organize the event biennially was decided in the year 1974.

Nagaland's wrestling is, in fact, famed for its spirit of brotherhood. In this indigenous sport, one's opponent is called 'Khrietho-u', which in Tenyidie — the official dialect of Nagaland's Tenyimia community, which comprises ten Naga tribes, namely Angami, Chakhesang, Zeme, Liangmai, Rongmei, Poumai, Mao, Maram, Rengma, and Pochury — means 'beloved friend'. This delineates the spirit of brotherhood and friendship involved in this unique brand of wrestling, which Nagas consider as old as their history. Wrestling continues to be the favorite sport in Naga society and draws some of the biggest crowds, and enthusiasts travel miles to watch.

Kene (/kɛnɛ/ kɛ-nɛ) or Naga wrestling is a folk wrestling style and traditional sport of the Nagas. It is closely related to Ssireum, the traditional national sport of Korea. The objective of the sport is to bring any part of the opponent's body above the knee to the ground.

Kene is played by the Tenyi–mi ethnic group of the Nagas—Angami, Chakhesang and Zeliangrong of Nagaland & Mao, Maram and Poumai of Manipur.

Each wrestler wears a coloured cloth tied around the waist. Holding the opponent's waist-binder with both hands, the wrestler must attempt to topple the other onto the ground. Kene is one of the oldest traditional games of the Nagas. Though this style of wrestling has been practiced in the region for several centuries, the modern version of the sport was developed only in the mid 20th century.The construction of the highway between Kohima and Imphal in the 1930s and 1940s brought together many Tenyimi villagers to participate in the road construction to earn some cash as it was a burden to pay house tax to the British regime as cash was scarce at that time. During lunch breaks, wrestling matches would be held among the

workers. Each respective village leaders chooses its best wrestlers to participate in the matches.

Traditionally, the match takes place within a circular ring, filled with mounded dirt. Modern matches are held in a wrestling ring. Contestants wear a towel or a belt around their waist which is used for takedowns.

At the start of the match both the contestants holds each other in a grappling position, in which each wrestler is grabbing the other's by their belt. The fight begins with the referee's whistle who works within the ring to judge and control the conduct of the wrestlers, rule on their ability to wrestler safely, count knocked-down wrestlers, and rule on fouls. A single match is contested in a best of three fights format, in which the wrestler to win two fights first wins the match. There are no weight classifications.

Conclusion:

Play is an expressive behavior common among all human beings and manifested overtly in all cultures. Different cultures or communities have different types of traditional games of their own. Traditional games of this concerned community were designed in such a way that one can develop lot of skills like logical thinking, mental ability, concentration, cooperation, team work and lot more. Especially for children traditional games are useful to improve their learning skill and creativity, hand-eye co-ordination, confidence and finally to have fun and utilization of free time. For adult also traditional or ethnic games play an effective role in maintaining their physical fitness and as a recreational activity or entertainment in their busy life schedule. Though the modernization and advent of modern technology has brought a lot of change and impact on traditional cultures of the society however, the people continue to pass their ethnic games and sports and other traditional cultures to the next generation. It has been found that, among the studied people, different ethnic games are still being played by them even by their younger generations. Such games are a very crucial part in their social festivals or in certain religious occasions. It is a community matter for them and both males, females can participate in it according to the specified rules of it. It is rather a combination of both tangible and intangible cultural heritage among them. However, there are some emerging consequences, where the concerned players are not getting enough recognition. On the other hand the youths are out migrating from the ancestral villages for their jobs and in this way they are getting detached from their very crucial ethnic tradition. It is expected that, the state government will seriously look into the matter to protect and preserve this rich ethnic heritage of the state and concerned ethnic group.

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Attitude Towards Inclusive Education: Insights from Tribal Elementary School Teachers

Dr. Agnes Humtsoe* Dr. Ritu Sarkar Isha Baby Nongrum*****
**Assistant Professor, Department of Education, Mizoram University, Aizawl*
***Assistant Professor, Department of Education Assam Don Bosco University, Guwahati*
****P. G Student, Department of Education Assam Don Bosco University, Guwahati*

Abstract

This study intended to assess the attitudes of tribal elementary school teachers towards inclusive education in the Ri-Bhoi district of Meghalaya. To achieve this, the researchers employed a descriptive method and a cross-sectional research design. The study included 330 tribal elementary school teachers, using a teacher attitude scale towards inclusive education to collect data. Quantitative data analysis was conducted using descriptive and inferential statistics. The findings revealed that most tribal elementary school teachers exhibit a moderate attitude towards inclusive education. The study also identified variations in attitudes based on gender and training status among these teachers, though no significant differences were observed between urban and rural tribal elementary school teachers. Based on the findings this study suggests that tribal elementary school teachers receive additional knowledge and training to enhance their attitudes and skills. This will enable them to effectively support diverse students in the classroom and help these students reach their full potential.

Keywords: *Attitude, Inclusive Education, Tribal, Elementary School, Teachers*

Introduction

Inclusive education is an approach to ensure equality and social justice for all individuals. It recognises education as a human right free from discrimination by including all societal segments and granting them access to inclusive education. The Convention on the Rights of Persons with Disabilities under Article 24 also mandates the state parties to ensure inclusive education at all levels without discrimination (United Nations, 2006). The Government of India has also developed numerous special education policies since the country's independence. For instance, the Kothari Commission (1966) highlighted the importance of educating children with disabilities. Likewise, the National Policy on Education, 1986 (NPE, 1986), and the Programme of Action (1992) stressed the need to integrate children with special needs with other groups, aiming to prepare them for normal growth and to foster courage and confidence. The Right of Children to Free and Compulsory Education Act 2009 and India's New Education Policy (NEP) 2020 also aim to establish social justice and equality. However, as per the report in NEP 2020, enrolment in schools is declining, particularly for socio-economically disadvantaged groups, with female students experiencing greater declines. According to U-DISE 2016–17 data, 19.6% of primary school students are members of scheduled castes, however at the higher secondary level, this percentage drops to 17.3%. The enrolment and retention rates of scheduled castes have been negatively impacted by several factors, including poverty, social customs, lack of access to high-quality education, and language obstructions. Special attention is required for Other Backward Classes (OBCs) who have historically been recognized as being socially and educationally backwards, the children from minorities, particularly those from underrepresented populations, children from tribal communities and children from scheduled tribes. These children due to a variety of historical and geographic constraints endure disadvantages on several levels (NEP, 2020). Hence, the

education system has to place a high priority on providing comprehensive and equitable education for all students, acknowledging education as a human right devoid of prejudice.

Inclusive Education

The Rights of Persons with Disabilities (RPWD) Act 2016 outlines inclusive education as a system of education wherein students with and without disabilities learn together and the system of teaching and learning is suitably adapted to meet the learning needs of different types of students with disabilities. Similarly, according to NCERT's (2020) Inclusion of Education: A Manual for School Management Committee, inclusive education denotes a teaching and learning approach that accommodates various student types with disabilities by designing a system of instruction that allows them to learn alongside students without disabilities. Children from various social, cultural, economic, geographic, linguistic, and gender disadvantages need special attention, including girls, scheduled castes, tribes, minorities, disabled, migration-affected, urban deprived, civil strife-affected, working as domestic help, children in conflict with the law, protective institutions, those affected by natural disasters and any other group having a disadvantage.

Thus, Inclusive education aims to meet the learning needs of all children, particularly those at risk of marginalization and exclusion. Being inclusive means that every student, regardless of their strengths or weaknesses, is an integral part of the school community. They experience a sense of belonging with their peers, teachers, and support staff. One of the primary objectives of inclusive education is to prepare students to become fully participating and contributing members of society (Sood & Anand, 2011).

Rational of the Study

The approach of inclusive education is very much in need today to ensure equitable access for all students, including those students with disabilities or diverse learning needs, in a normal classroom setting without any discrimination. This approach aligns with international frameworks such as the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and Sustainable Development Goal 4 (SDG 4), accentuating inclusive and equitable quality education for all. (United Nations, 2006; UNESCO, 2020). Yet in a country like India, the education system is still facing immense challenges as disparities are still seen especially among the socio-economically disadvantaged groups (NEP, 2020) in implementing inclusive education despite the numerous efforts of the government through its various policies. To implement inclusive education, the policies alone are not sufficient, the teachers at the grassroots level of the education system must be well aware of its implementation process and strategies. Moreover, teachers' attitude also matters the most as they are the ones who will be dealing with diverse categories of students in the classroom.

Research studies correspondingly expressed that teachers' attitudes significantly impact student performance in an inclusive environment, affecting their academic achievement, social integration, and emotional well-being. (Scruggs & Mastropieri, 1996; Avramidis & Norwich, 2002). Similarly, Kalita (2017) highlighted that supportive and optimistic teacher attitudes are crucial for the success and well-being of children with disabilities in inclusive classrooms, with experienced teachers showing more positive attitudes than less experienced ones. Similarly, Emam and Mohamed (2011) found that teachers with more experience exhibit more positive attitudes towards teaching pupils with special educational needs (SEN) compared to those with less experience. Geeta and Yadav (2021) also assert that teacher

attitudes towards inclusive education are strongly influenced by training and experience, with trained educators better able to accommodate diverse student needs. Further, Saloviita (2018) suggests that the success of integrating students with SEN into regular classes is significantly influenced by teacher attitudes. The study displayed that Finnish special education teachers had more positive attitudes towards inclusion than classroom or subject educators, approximately 20 per cent of all teachers strongly opposing inclusion and 8 per cent strongly supporting it. Gökdere (2012) discovered significant differences in attitudes towards inclusive education between in-service teachers and pre-service teacher candidates, with the latter demonstrating more positive attitudes. Lindner, Schwab, Emara, and Avramidis (2023) reviewed 36 studies which indicated that teachers of primary school mostly have neutral attitudes towards inclusive education. Further, Priyadarshini and Thangarajathi (2017) accentuate the importance of ongoing professional development and attitude-building programs for teachers to foster positive attitudes towards inclusive education. All these studies point to the very fact regarding the need to foster positive attitudes of the teachers towards inclusive education.

In light of the above, to successfully implement equality practices, teachers' attitudes are a critical factor and it is necessary to understand the attitudes of teachers for strategic professional development programs and support systems to boost their confidence and competence in inclusive teaching (OECD, 2014; Florian & Spratt, 2013). Therefore, the researchers felt the need to examine the attitudes of tribal elementary school teachers in the Ri-Bhoi district of Meghalaya towards inclusive education. With its insights into elementary school teachers' attitudes toward inclusive education. The findings will provide valuable insights into these teachers' attitudes, highlighting areas where practice and policy need improvement. This will serve as a guide to improve teacher preparation and support initiatives that promote inclusive learning environments for all students.

Research Questions

1. What is the attitude of the tribal elementary school stage teachers towards inclusive education in Ri-bhoi district of Meghalaya?
2. Is there a difference in the attitude of the tribal elementary school stage teachers towards inclusive education based on gender, locality and qualification in Ri-bhoi district of Meghalaya?

Purpose of the Study

1. To study the attitude of tribal elementary school stage teachers towards inclusive education in Ri-bhoi district of Meghalaya.
2. To find out the attitude of male and female tribal elementary school stage teachers towards inclusive education in Ri-bhoi district of Meghalaya.
3. To compare the attitude of urban and rural tribal elementary school stage teachers towards inclusive education in Ri-bhoi district of Meghalaya.
4. To study the attitude of trained and untrained tribal elementary school stage teachers towards inclusive education in Ri-bhoi district of Meghalaya.

Hypotheses of the Study

H0 (1): There is no significant difference in the attitude of male and female tribal elementary school stage teachers towards inclusive education in Ri-bhoi district of Meghalaya.

H0 (2): There is no significant difference in the attitude of urban and rural tribal elementary school stage teachers towards inclusive education in Ri-bhoi district of Meghalaya.

H0 (3): There is no significant difference in the attitude of trained and untrained tribal elementary school stage teachers towards inclusive education in Ri-bhoi district of Meghalaya.

Method

The investigators employed a descriptive survey method with a cross-sectional research design and the nature of the research is quantitative in approach.

Participants

The population of the present study covered all English medium elementary school tribal teachers in two blocks i.e., Umling block and Bhoirymbong block under the Ri-bhoi district of Meghalaya in Northeast India. In record, there are 363 elementary schools located in Umling block and 250 elementary schools in Bhoirymbong block, with a total number of 1973 teachers. However, a sample of 24 English medium elementary schools was selected using a random sampling technique and all the tribal teachers teaching at the elementary level of the selected sampled schools have been included in the current study which is 330 in number.

Materials

The required data was collected using a standard Teacher Attitude Scale Towards Inclusive Education developed by Vishal Sood and Arati Anand (TASTIE-SA, 2011). The scale comprises four dimensions -Psychological/ Behavioural Aspects of Inclusive Education, Social and Parents-Related Aspects of Inclusive Education, Curricular and Co-Curricular Aspects of Inclusive Education, and Administrative Aspects of Inclusive Education. The scale has 47 items where 29 items are favourable and 19 items are unfavourable. The items are scored so that a 'Agree' response to a favorable item receives a score of 3; an 'Undecided' response receives a score of 2, and a 'Disagree' response receives a score of 1. Conversely, when it comes to unfavorable items, the scoring process is inverted as follows: if the response to an unfavorable item is "Agree," a score of 1 is awarded and a score of 3 is granted when the response is "Disagree. The undecided option receives a proportionate score of 2. The respondent's overall attitude score is determined by adding their scores from each of the scale's statements. The scale's score ranges from 47 and 141.

Statistical Treatment

For analysing the data mean, standard deviation, frequency and t-test were employed.

Result of the Study

1. Level of Attitude Towards Inclusive Education Among the Elementary School Stage Teachers

Table -1: Level of Tribal Elementary School Stage Teachers Towards Inclusive Education

N	Mean	Sd	Range of Mean Value	Range of Scores	Frequency	%	Level of Attitude
330	107.6	10.35	97.25-117.95	127 & above	3	1	Extremely Favourable
				116-126	70	21	Most Favourable
				105-115	122	37	Above Average Favourable
				90-104	130	39	Moderate Attitude
				80-89	5	2	Below Average Unfavourable

As shown in Table 1 it is observed that 39 per cent of tribal elementary school teachers scored between 90-104, indicating a moderate attitude towards inclusive education. 37 per cent of these teachers scored between 105-115, reflecting an above-average favourable attitude. Meanwhile, 21 per cent scored between 116-126, which is considered a highly favourable attitude towards inclusive education. Only 1 per cent of tribal elementary school stage teachers scored above 127 out of the maximum score of 141 indicating an extremely favourable attitude. The remaining 2 per cent scored between 80-89 falling into the category of below-average unfavourable attitudes towards inclusive education. These results disclose a range of attitudes among tribal elementary school teachers towards inclusive education. However, there is potential to enhance these attitudes further to make inclusive education a reality.

2. Comparison Between Male and Female Tribal Elementary School Stage Teachers Towards Inclusive Education

H0 (1): There is no significant difference in the attitude of male and female tribal elementary school stage teachers towards inclusive education.

Table 2: Comparison between Male and Female Tribal Elementary School Teachers on the attitude towards Inclusive Education

Variable	Sub-Groups	N	Mean	Sd	Df	t Value	p Value	Remark
Gender	Male	111	104.88	11.33	328	3.433	0.01	Significant at 0.05 level
	Female	219	108.95	9.55				

The mean score and standard deviation for male tribal elementary school teachers are 104.88 and 9.55, respectively. For female tribal teachers, these values are 108.95 and 9.55. The table shows that at 0.05 significance level with 328 degrees of freedom, the computed t-value is 3.433, greater than the criterion value of 1.97($p<0.05$). Therefore, the hypothesis stating that there is no significant difference in the attitudes of male and female tribal elementary school teachers towards inclusive education is rejected. This indicates a significant difference in attitudes between male and female tribal elementary school teachers regarding inclusive education. Furthermore, the mean score for female tribal teachers is higher than that for male tribal teachers, suggesting that female tribal elementary school teachers have a more favourable attitude towards inclusive education.

3. Comparison Between Urban and Rural Tribal Elementary School Stage Teachers Towards Inclusive Education.

H0 (2): There is no significant difference in the attitude of urban and rural tribal elementary school stage teachers towards inclusive education.

Table 3: Shows the significant difference in the attitude of urban and rural tribal elementary school stage teachers towards inclusive education

Variable	Sub-Groups	N	Mean	Sd	Df	t Value	p Value	Remark
Locality	Urban	99	106.43	10.23	328	1.324	0.186	Not Significant at 0.05 level
	Rural	231	108.077	10.38				

The computed mean and standard deviation for urban tribal elementary school teachers are 106.43 and 10.23, respectively. For rural teachers, the values are 108.077 and 10.38. The table shows that at 0.05 significance level with 328 degrees of freedom, the computed t-value is 1.324 is lesser than the criterion value of 1.97(p>0.05).. Therefore, the outlined hypothesis that there is no significant difference in the attitudes of urban and rural elementary school teachers towards inclusive education is retained. This indicates that there is no significant difference between urban and rural tribal elementary school teachers in their attitudes towards inclusive education.

4. Comparison Between Trained and Untrained Tribal Elementary School Stage Teachers Towards Inclusive Education.

H0 (3): There is no significant difference in the attitude of trained and untrained tribal elementary school stage teachers towards inclusive education.

Table 4: Shows the significant difference in the attitude of trained and untrained tribal elementary school stage teachers towards inclusive education

Variable	Sub-Groups	N	Mean	Sd	Df	t Value	p Value	Remark
Qualification	Trained	110	109.07	9.02	328	1.973	0.050	Significant at 0.05 level
	Untrained	220	106.84	10.88				

The computed mean and standard deviation for trained tribal elementary school teachers are 109.07 and 9.02, respectively, while for untrained teachers, the values are 106.84 and 10.88. At 0.05 level of significance for 328 degrees of freedom, the computed t-value is 1.973, which exceeds the critical value of 1.97 (p<0.05). Thus, the hypothesis that there is no significant difference in the attitudes of trained and untrained tribal elementary school teachers towards inclusive education is rejected. This indicates a significant difference between trained and untrained tribal teachers in their attitudes towards inclusive education. The higher mean score of trained teachers suggests that they have a more favourable attitude towards inclusive education than the untrained teachers.

Conclusion

From the analysis presented in the tables, it is evident that most tribal elementary school teachers exhibit a moderate attitude towards inclusive education. The study also revealed differences in attitudes based on gender and training status among these teachers. However, no significant difference was found between urban and rural tribal elementary school teachers. Therefore, it is suggested that tribal elementary school teachers receive knowledge and training to improve their attitudes and skills, ensuring they can effectively support diverse students in the classroom and help them reach their full potential.

Implications

This research on tribal elementary school teachers' attitudes toward inclusive education in Ri-bhoi district of Meghalaya identifies significant areas for intervention to improve inclusive practice. Some of the implications include;

- Teacher Training and Professional Development: The study emphasizes the significance of continuous professional development programs for teachers in cultivating good attitudes toward inclusive education. It is recommended that tribal elementary school teachers should get more opportunities for training and seminars to increase their awareness of inclusive practices and their ability to accommodate varied student needs.
- Gender Sensitivity in Education: The significant difference in attitudes toward inclusive education between male and female tribal elementary school teachers emphasizes the importance of gender sensitivity in educational training programs. Efforts should be made to overcome gender prejudices and provide equal chances for male and female teachers to participate in inclusive practices.
- Localization of Strategies: The discovery that there is no significant difference in attitudes toward inclusive education among urban and rural tribal elementary school teachers suggests that localized strategies may be effective in promoting inclusive practices across different geographical contexts. Interventions that are tailored to the specific problems and resources available in rural and urban contexts can improve education inclusion for Indigenous people.
- Importance of Teacher Qualification: The study found significant differences in the attitude toward inclusive education between trained and untrained tribal elementary school teachers. This underlines the significance of teacher education and training programs in fostering a good attitude toward inclusion. Investing in teacher training can help them establish more inclusive learning environments and meet the different needs of their students.
- Enhancing Teacher Attitude for Quality Education: Overall, the study recommends that tribal elementary school teachers' attitude toward inclusive education should be improved to deliver quality education and assist children reach their full potential. To provide equal access to education for all students, including those from indigenous communities, efforts should be directed at removing barriers, providing necessary assistance, and cultivating an inclusive culture within educational institutions.

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Transformation and Adapting of Rural Settlements Towards Tourism: A case study of Mawlynnong. North East India

Ibynta Bakmen Tiewsoh[1] and Dr Priyaleen Singh[2]
Research Scholar[1], Professor of Architectural Conservation[2]
School of Planning and Architecture, New Delhi, India
Email: ibynta@gmail.com[1], p.singh@spa.ac.in[2]

Introduction

Tourism is one of the world's largest economic sectors that creates jobs, drives exports, and generates prosperity across the world. There are also several related developments which is directly and indirectly related to this field. It can span from the tangible creation of assets and infrastructure for assistance to the visitors to the intangible exchange of ideas, showcasing of culture and renewed interest, respect, and collective pride in its preservation. India as a sub-continent is diverse in landscapes, culture, heritage, adventure, wildlife, and cuisine which has more than a little for any kind of tourist to whet their wanderlust and interest. The central government has undertaken a number of initiatives to develop tourism by providing financial assistance and subsidies to individuals and entities to developing infrastructure. India has just recently launched two flagship schemes for this sector called 'Swadesh Darshan', and 'National Mission on Pilgrimage Rejuvenation and Spiritual Heritage Augmentation Drive (PRASHAD) with the objective to develop sustainable and responsible destinations following a tourist & destination centric approach. Besides this Dekho Apna Desh initiative was also launched to encourage people to explore and travel within the country. E Visa has been liberalised and fees reduced for citizens of 167 countries to facilitate easier entry into the country. RCS-UDAN Scheme, a collaboration between Ministry of Tourism and Ministry of Aviation has been started to improve air connectivity to 53 tourism routes and destinations (Government of India, 2023). NIDHI (The National Integrated Database of Hospitality Industry) an initiative towards Aatmanirbhar Bharat is a technology driven system to empower businesses and serves as a platform for the Hospitality organisations to ideate, share best practices and connect with the Government for ease of doing business. This has been upgraded to NIDHI+ to include not only Accommodation Units, but also Travel Agents, Tour Operators, Tourist Transport Operators, Food & Beverage Units, Online Travel Aggregators, Convention Centres and Tourist Facilitators (Ministry of Tourism, 2021).

The Tourism and Hospitality sector is an integral part of the Make in India initiative and therefore serves as a vital economic catalyst that fuels job creation and rapid development. It acts as a stimulant for the growth of multi-use infrastructure, including world-class hotels, resorts, exquisite restaurants, efficient transportation networks (aviation, roads, shipping, and railways), and state-of-the-art healthcare facilities (Government of India, 2022). This comes out of recognition that this sector can in turn help alleviate poverty and enhance skill development as many jobs can be created through growth in the tourism and hospitality industry (Hazra, 2018).

Rural tourism shaping rural development

Rural tourism is a crucial component of rural development. In addition to adapting and

enhancing already-existing rural amenities and cultural assets as lodging and tourist attractions, rural tourism requires the involvement of the local workforce. Besides agricultural activities in rural areas, rural tourism provides an important alternative source of livelihood.

Tourism in Meghalaya

Among the North-Eastern states, Meghalaya has the highest footfall after the states Assam and Sikkim. The footfalls have grown steadily over the last decade (Figure 1). The Meghalaya State Government has taken a keen interest in developing tourism and expects the industry to grow by ten percent every year and the projected tourist footfall is set to be 20 lakhs annually by 2028.

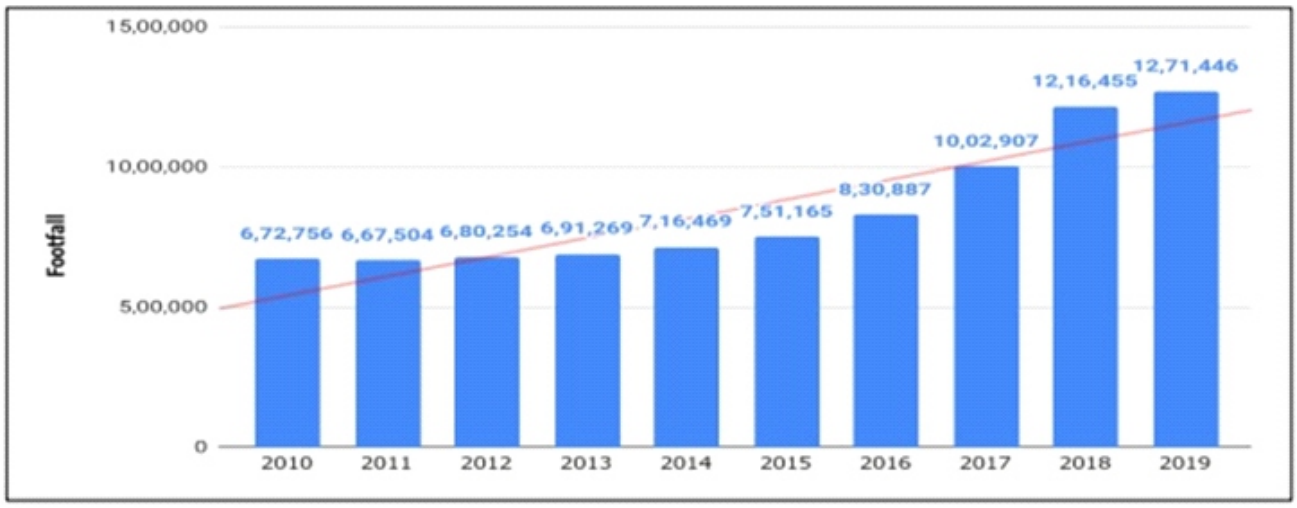

Figure 1: Tourist footfall in Meghalaya
Reference: Meghalaya Tourism Policy 2023

Case study of Mawlynnong

Mawlynnong is a village in the East Khasi Hills District, Meghalaya in North - East India. The village is located 75 kms away from the capital city, Shillong. Situated to the south of the state along the India – Bangladesh border, it covers an area of approximately 66 Hectares.

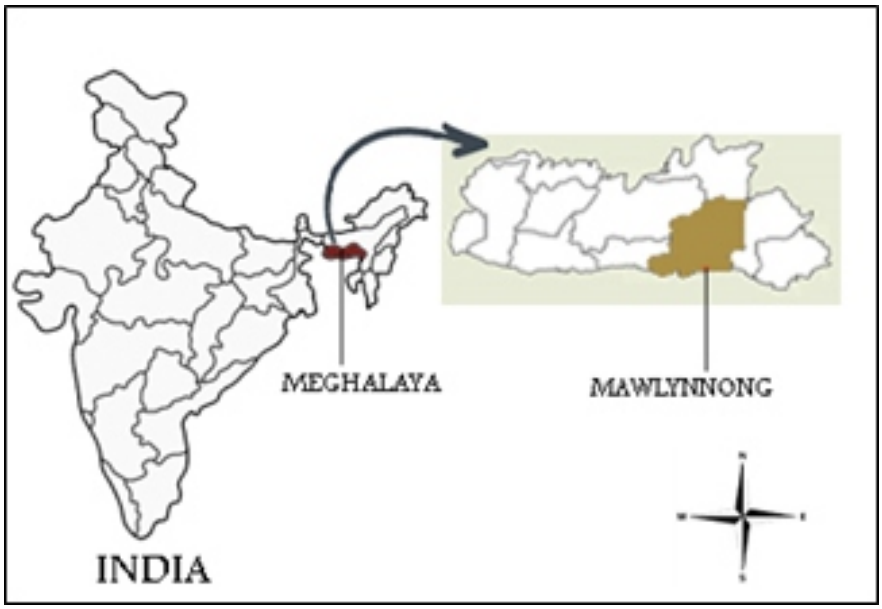

Figure 2: Location of Mawlynnong Village, East Khasi Hills, Meghalaya
Reference: Author

Mawlynnong came into the tourism limelight when in 2003, when Discover India declared the village as being the cleanest village in Asia. The aspect which draws tourists to this village, is to appreciate how a population of 542 people have managed to plan and shape their built surrounding into an oasis of a variety of flora lining up the main roads and pathways, as well as beautifying their own properties and cottages. The Swachh Bharat Mission was launched in 2014, while this community has been able to keep their surroundings clean for generations back, a healthy practice and a tradition which is diligently followed daily. The village is one of the most visited destinations for tourists who come to the state (Table 1) with the highest recorded footfalls in the summer and winter breaks.

Month	Tourist footfall
May	19788
July	8975
August	6493
September	4618
October	9938
November	9022
December	13430

Table 1: Tourist footfall in Mawlynnong in the year 2023
Reference: Village records for Directorate of Tourism, Government of Meghalaya

The surge in rural tourism has increased the demands by the tourism industry in Mawlynnong village, thereby having a significant impact on their economy, the cross sociocultural understanding and overall environment of the village.

Economic Impact

Due to its tremendous success in drawing tourist interest, the infrastructure has improved significantly. The economic benefits from people involved in rural tourism industry has been significant. Table 2 shows the growing number of businesses in the hospitality and tourism sector, from people who are employed in the maintenance of the village to the individuals who own and run businesses, which can be selling goods, running homestays and transportation of tourists, village tour guides, restaurant owners etc. the employment opportunity has been varied.

	Businesses catering to the tourism	Nos as of the year 2024
1	Guest House	11
2	Homestay	27
3	Restaurants	7
4	Tea shops	6
5	Shops	25
6	Parking capacity	55 cars
7	Public toilets	15
8	Hospitality and management	50 employed
9	Cleaning and Maintenance of the village	6 employed
10	Parking entry	3 employed
11	Repairs	Daily wage skilled workers employed
12	Craft and building in bamboo	Daily wage skilled craftsmen employed
13	Landscaping and beautification	Daily wage skilled landscaper employed
14	Local guides	Daily wage trained guide employed

Table 2: Tourism related businesses
Reference: Author, data collected from field survey and interviews

Sociocultural Impact

Cross-cultural exchanges facilitated by tourism have improved our understanding of other cultures. Mawlynnong has gained recognition and admiration from travellers from all over the world. The locals are conscious of the heritage value they have contributed. Due the rise in tourism, the village has been able to adapt to the changes. In the course of working together to meet the demands of the tourism sector, they have created a model tourist village that has personality and identity and is a vibrant hub for rural tourism. Apart from offering a warm welcome to the constant influx of visitors, the residents carry on with their daily routines, acknowledging that tourism has become an essential aspect of their identity.

Environmental Impact

Infrastructure is being developed in all directions and has been put in place gradually to make traveller and community life easier. The village has benefited greatly from these initiatives. But as more people visit the area, the land will be under tremendous strain, which will take a toll on the built and natural environments. To effectively handle the anticipated increase in population in the upcoming years, the village administration will need to plan for the future.

	Government Schemes	Item
1	Department of Tourism, Government of Meghalaya	Guesthouses
2	Border Area Development Department	Parking
3	Mahatma Gandhi National Rural Employment Guarantee Act	Renovation and Protection of Water Bodies
4	Infrastructure Development Finance Company	Solar lighting
5	MLA Scheme	Solar lighting
6	Pradhan Mantri Awas Yojana	House construction
7	PHE, JJM	Water Supply

Table 3: Infrastructural Development
Reference: Author, data collected from field survey and interviews

Change in Land use

The development of Mawlynnong village is mainly a linear settlement pattern (Figure 3) following the gentle contour topography. The built environment runs along the spine of the main roads, with the agricultural land extending behind the settlement. From the linear pattern, there are secondary pathways branching off to lead to different individual clusters. The cluster patterns in this case, have families living near each other. The houses forming a cluster face an exterior common space, which are usually meant for outdoor agricultural or social activity. The physical barriers to demarcate the spaces are shrubs and plants which adds to the unique character of the village.

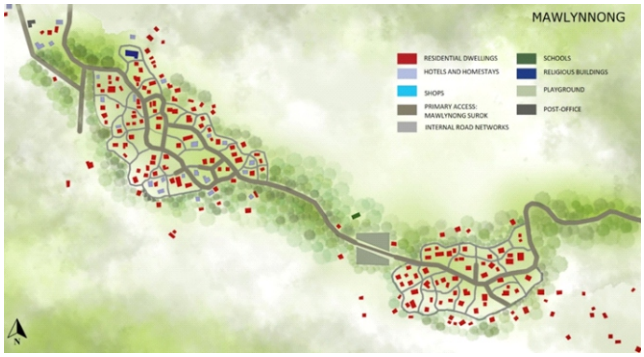

Figure 3: Land Use at Mawlynnong Village, East Khasi Hills, Meghalaya,2023
Reference: Author

Mawlynnong is one of the most sought-after destinations in the state, for tourists to visit. To be able to accommodate and manage the influx of tourism, many households have added additional rooms or extended their houses to open up homestays or guesthouses. This has changed the spatial dynamics and interactions that occur within the clusters. Homestays and guesthouses are at present found mostly along the main road, but the economic benefits of tourism have allowed for many more tourist accommodations to be constructed in the peripheral extents of the village (Figure 4).

Figure 4: Way finding signages, leading to Homestays that are found in Mawlynnong. Reference: Author

The architectural character of the village was originally of thatched cottages made from bamboo, areca tree and palm leaves. The traditional layout was an open plan with a clay hearth at the centre and sleeping compartments at the sides. But to maintain these structures, it has proven to be expensive. Many households see RCC structures to be more economically viable because of one time construction and low maintenance, with modern facilities to cater to tourists as well as for themselves. This surge in RCC construction has started to change the rural architectural character. However, efforts are ongoing by the village Tourism sub – committee for planning and preserving the character by laying down guidelines for height restriction and to provide thatched roofs for the structures being built. The material and built heritage of bamboo craft is evident in the sightseeing platforms or tree decks and the street furniture which are strategically placed around the settlement (Figure 5).

Figure 5: Local craft construction in bamboo and stone for street furniture and features. Reference: Author

Conclusion

As per economic survey 2022 – 23, 65% of the Indian population lives in rural areas. Out of this 47% depend on agriculture for their livelihood. As India is aspiring to be a $5 Trillion economy by 2025, it needs to look at rural tourism as a way of enabling these communities to be self-sustainable. Making the community grow economically is one aspect of rural tourism but preserving the cultural heritage and unique character of the village is most valuable. It is important to be aware of what developing a heritage community would mean.

Understanding the different heritage values of the village and what it offers is required before more infrastructure and redevelopment takes place. For future expansion, a conscious guided effort to have zones for the tourists, pathways to take a pleasant trek and to enjoy the tourist activities, away from the residential zones would be recommended. This would bring a sense of relief and privacy for families to move freely in their own space. Guidelines on the design of structures or homestays that would complement the setting can be set in place. The village has a rich culture of built heritage which the visitors are also interested in. Therefore, preservation of the built and natural heritage is necessary so that the essence of the space is not lost. The findings of this study can contribute to rural planning while addressing rural tourism development.

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About the authors:

Ibynta Bakmen Tiewsoh is currently a research scholar at the Department of Architectural Conservation, School of Planning and Architecture, New Delhi. She is an Assistant Professor at the Department of Architecture, North – Eastern Hill University, Shillong. She is an active member at ICOMOS India, NE Zone and the co – convenor of INTACH Meghalaya Chapter where there is strong collaboration and participation with the communities to conserve their heritage.

Dr. Priyaleen Singh is a Professor and Head of the Department of Architectural Conservation at the School of Planning and Architecture, New Delhi. She was awarded her Ph.D. from the U.K. and she has a Master's degree in both Landscape Architecture and Architectural and Urban Conservation and a D. Phil from Institute of Advanced Architectural Studies, University of York, U.K. Dr. Priyaleen Singh is the author of the book "Conserving the Spirit of a Historic Garden" and a prominent figure in the field of Architectural Conservation and Landscape Architecture where she has worked on several Urban Conservation and Historic Landscape Conservation projects.

Oyster Mushroom Farming as a Potential Component of Urban Agriculture

Vijay Kumar[1] and Ashok Chhetri[2]

Affiliation: [1]Assistant Professor, Plant Protection-Pathology, Multi Technology Testing Centre & Vocational Training Centre, College of Fisheries, Central Agricultural University (Imphal), Lembucherra, Agartala- 799210, Tripura, India

Email: vnarwal777@yahoo.com

[2]Assistant Professor, Horticulture-Fruit Science,Multi Technology Testing Centre & Vocational Training Centre, College of Fisheries, Central Agricultural University (Imphal), Lembucherra, Agartala- 799210, Tripura, India

INTRODUCTION

Agriculture is the main source of food on the planet earth from the ancient time. Agriculture industry is the backbone of the economy of the developing countries like India. As the human being advanced in science and technology, it has a negative impact on the agriculture. The most important factors which impact the growth of the agriculture is urbanisation and industrialization. According to UN (2019) the population of earth will be increased nearly about 11 billion, which lead to hunger and starvation conditions as per the growth reduction in agriculture. Urban agriculture (UA), which was practiced since ancient times, captured attention as a potential solution. According to Smit et al. (1996), Urban Agriculture can be defined as "an industry that produces, process and markets food and fuel, largely in response to the daily demand of consumers within a town, city or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods, using and reusing natural resources and urban wastes, to yield a diversity of crops and livestock."Urban agriculture has advantage like it contribute to local food security by increasing the availability and accessibility of fresh and healthy produce in food insecure areas in cities (Martellozzoet al., 2014; Mack et al., 2017).

Mushroom are the part of healthy diet since time, they are included in the diets of the Royal families and hence known as the "Royal Food". Mushroom are rich source of protein, vitamins, minerals like phosphorus, potassium, calcium, sodium and selenium. Apart from its food values mushroom are used for manufacturing of variety of drug and medicines. Oyster mushroom is the 2nd largest cultivated mushroom after white button mushroom worldwide. The main reason for its wide cultivation around the world is ease of cultivation, wide range of substrate availability and different species of Pleurotus available in different agroclimatic regions. China is the largest producer of the oyster mushroom in world which hold the around the 74% share of the world oyster mushroom production. There are more than 40 species of Pleurotus recorded worldwide till date, out of which 25 species are cultivated in different regions of the world. Most commonly cultivated Pleurotus species world are P. ostreatus, P. florida, P. sajar-kaju, P. djamor, P. eryngii, P. tuber-regium, P. citrinopileatus, P. populinus, P. cystidiosus, P. cornucopiae, P. pulmonarius, and P. hulmarius etc. (Khare et al., 2010).

P. ostreatus

Pleurotus ostreatus is the cultivated edible mushroom worldwide. This mushroom has added the diversity among the cultivated mushrooms. The mushroom cab be easily cultivated on a variety of range of substrate which are having high lignocellulosic composition. Its cultivation generally does not require high infrastructure for cultivation compared to other mushrooms.

P. florida

This mushroom could be easily cultivated under temperate, subtropical and tropical regions of the world due to its high adoptability to the wide range of climate regimes. Again P. florida is popular as usual Plerotus are easy to cultivate, rich source of protein, minerals and vitamins.

P. sajor-caju

This is another species of the oyster mushroom which is successfully cultivated for its exotic flavours. P. sajorcaju has high content of potassium and sodium ratio compared with other mushroom. The other properties are similar to rest of species of the Pleurotus.

P. djamor

Pink oyster mushrooms, scientifically known as Pleurotus djamor, are a species of tropical mushroom found worldwide. It usually grows on trees, forming dense clusters of a vivid pink colour that vary in size, shape, and number of mushrooms.P. djamorhas very unique taste which some people corelate with its taste to non-vegetarian protein i.e. meat specially with bacon.

P. eryngii

This mushroom is commonly known as the King oyster mushroom. It is a type of Pleurotus specieswhich is typically found in the temperate region of the world especially in mediterrian region. This mushroom is rich in protein, vitamins and minerals and have longer shelf life than other species of the Pleurotus.

P. citrinopileatus

P.citrinopileatus is known as the golden oyster mushroom which is the edible species of the Pleurotus mushroom, originally found in Russia, China and Japan. The fruiting bodies of P. citrinopileatus grow in clusters of bright yellow to golden brown caps with a velvety, dry surface texture.

General cultivation practices of Pleurotus Mushroom (Kumar and Chhetri, 2023)

Oyster mushroom (Pleurotus spp.) is commonly called Dhingri in India. It has oyster-like shape because of which it is popularly known as oyster mushroom. Its cultivation can be done on number of agricultural wastes and organic waste materials. The important substrates include straw of different cereals, sugarcane waste, cotton waste, jute, groundnut pod shells, small wood pieces, saw dust, maize cobs, banana pseudostems, etc. depending upon the widespread availability of these materials. General cultivation method of cultivation of Pleurotus mushroom.

Substrate preparation

It is commonly cultivated in Tripura on paddy straw, due to their easy availability in large quantities. The straw of 4-6 cm size is chopped and dipped in cold water for 10-12 hours. Straw can besterilized by various methods as given below:

1. Hot water treatment: The soaked straw is dipped in hot water at 80oC for 2 hours. Hot water treatment makes hard substrate soft so that growth of the mycelium takes place very easily. This method is not suitable for large scale commercial cultivation.

2. Steam pasteurization: In this method pre-wetted straw is pasteurized by passing steamthrough the straw for 2-3 hours. This method is used for commercial cultivation.
3. Chemical sterilization technique: In this method 7.5g bavistin and 125 ml formalin are dissolved in 100 litre water and slowly poured on the heap of wheat straw. Soaked straw is covered with a polythene sheet. After about 18 hours the straw is taken out and excess water drained off.

b. Spawning

Spawning rate in wet substrate is 2 to 2.5 % and the spawning is done in layers or even in thorough spawning care should be taken that the spawn gets uniformly mixed with the substrate, while in layer method the spawn is mixed after each layer of 3-4 cm thickness of straw. Polythene bags are found economical for cultivation of Pleurotus. After filling the bags with substrate bags should be tied with thread on top and holes has to be made for diffusion of gases and heat generated inside. Spawned mushroom bags have to be kept in a mushroomhouse at 22-26°C temperature with relative humidity 80-85%.

c. Cropping and management

After preparation of mushroom bags, white cottony growth will be appeared in mushrooms bags within 18-20 days. These bags are cut open and water should be sprayed daily in morning and evening time to maintain R.H 80-85% and temperature 20-22 °C. Pinning starts appearing within next 5-7 days and mushroom for harvest are available within 4-5 days of pinning.

d. Harvesting &Yield

Mature mushrooms are harvested by twisting and lifting of fruiting bodies with help of two fingers and a thumb. The cropping stage lasts for 30-45 days by maintaining at the 20 – 25°C, 85 – 92 % humidity. The average yield comes around 100-125 kg mushrooms / 100 kg dry paddy straw or substrates.

e. Marketing and Preservation

Harvested mushrooms are packed in polythene bags and sold in the market as fresh or packed bags can be stored for 4-6 days in refrigerator. For long term storage these mushrooms can be dried and different pickles can be prepared.

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Corporate Social Responsibilities: A Study on issues and Challenges in North-east India

Dr Rumi Dhar
Assistant Professor, Department of Law, Nagaland University, Lumami, Email: rumidhar@nagalanduniversity.ac.in.
&
Ms Sonia Nath
Research Scholar, Department of Law, Nagaland University, Lumami, Email: sonia_rs2022@nagalanduniversity.ac.in

Abstract

Corporate social responsibility (CSR) has become a vital aspect of business operations around the world. It entails companies acknowledging and taking responsibility for the impact of their activities on society and the environment. In Nort East India, where the socio-economic and environmental challenges are unique, the adoption of Corporate Social Responsibility practices presents both opportunities and challenges for organizations operating in the region.

This paper presents a comprehensive study on corporate social responsibility (CSR) in North East India, focusing on the various issues and challenges faced by companies operating in the region. This study examines the current status of CSR practices in Northeast India, the initiatives taken by companies, and the obstacles they encounter. The findings highlight the need for companies to tailor their Corporate Social Responsiblity strategies to align with the specific needs and concerns of the local communities in order to achieve sustainable development and social impact. Overall, the study contributes to the understanding of CSR in a regional context and provides insights for companies aiming to enhance their social responsibility efforts in North East India.

Keywords: *Corporate Social Responsibility (CSR), North East, Companies Act 2013, and Sustainable Development.*

INTRODUCTION:

Corporate ethics and governance are two significant factors for a company's smooth operation. Ethics represents a company's values and principles while conducting its day-to-day affairs. On the other hand, corporate governance regulates the Company's internal framework. Corporate governance is designed and implemented to govern the interest of the investor and other stockholders of the Company. These norms are not only to shape the relationship between the BOD and shareholders but also to resolve conflicts. The Organization exhibiting higher corporate governance standards sets a benchmark for others and builds trust in the minds of investors, resulting in the Company's financial prosperity.

Corporations are social entities and require support from society, either in the form of resources or human resources, for their long-run success and survival—the responsibility of the corporation is to repay society through CSR initiatives and contribute to society. Corporate Social Responsibility has become a new business strategy in recent years, and many companies have participated in CSR initiatives. India is also one of the first countries to participate in CSR initiatives such as TATA Chemicals Ltd, Infosys Ltd, Bharat Petroleum Corporation Ltd, Mahindra & Mahindra Ltd, India Oil Corporation Ltd, Hindustan Unilever Ltd Etc. The

government of India has made a significant intervention in CSR and made it compulsory for Public and Private Companies to spend 2 per cent of their net profit on CSR, resulting in amendments to the Companies Act 1956 and the insertion of Section 135 under the Companies Act 2013.

Through CSR initiatives, companies try to maintain equilibrium between economic, legal, social and environmental issues resulting from profit-making processes. These initiatives are advantageous to society. The primary purpose of CSR is to provide welfare to society. An increasing amount of CSR will accelerate the social development process. However, in India, there is spatial inequality in CSR spending. North Eastern states receive the least CSR spending compared to other states. Awareness must be created among the Companies to spend the CSR amount in those areas where development is lacking so that their contribution supports India's development process.

From a company perspective, one of the key challenges faced in Northeast India is the lack of awareness and understanding about CSR. Many companies in the region are still primarily focused on profit-making and do not see the value in investing in social or environmental initiatives. This study seeks to shed light on these challenges to improve CSR practices in North East India.

GROWTH OF CSR IN INDIA:

Corporate Social Responsibility in India refers to the changes over time in the corporate culture. CSR brings about an overall positive impact on society, the social issues, and the challenges on which States generally focus. Indian CSR history has four phases that resulted in the growth of CRS. The phases of growth are not static and may overlap with another phase.

Phase I: Charity was the main driver of CSR.
Phase II: During the independence movement, industries contributed toward the development of society.
Phase III: During 1960-80, the phase of the mixed economy, whereby enactments on corporate governance, labour law and environmental issues were considered.
Phase IV: 1980- Present day, Indian Companies deviated from old CSR initiatives and shifted towards sustainable business growth.

It is an integral concern for the environment and society. The positive attitude of the companies is attributed towards sustainable development. In 2013, Central Govt. came up with the provision of compulsory CSR under section 135 of the Companies Act. The 2013 Act aims to develop a culture in the business community to spend at least a certain amount on social initiatives. The year 1999 World Business Council for Sustainable Development explained Corporate Responsibility in three parts:

i) 1St part is Corporate Financial Responsibility (CR)
ii) 2nd part is Corporate Environmental Responsibility (CER) and
iii) 3rd part is Corporate Social Responsibility (CSR); thus, it implies that CSR is an integral part of CR.

The North Eastern States have a very challenging environment because of their remoteness. Therefore, developments in these areas were comparatively slower, but it has been noticed that some of the companies have shown their initiatives for development.

According to Schedule VII of the Companies Act, the following activities may be included by Companies in their CSR policies:

1. Eradicating hunger, poverty and malnutrition,
2. Promoting health care,
3. Promoting education and employment,
4. Promoting gender equality and empowerment of women,
5. Ensuring environmental sustainability and ecological balance,
6. Protection of national heritage, art and culture,
7. Measures for the benefit of armed forces veterans, war widows and their dependents,
8. Promoting rural sports,
9. Contribution to the PM relief fund,
10. Contribution towards technological and medical development,
11. Contributions towards public-funded Universities,
12. Rural and slum development and
13. Disaster management, relief and rehabilitation activities.

CONCEPTUALIZATION OF CORPORATE SOCIAL RESPONSIBILITY:

Section 135 of the Companies Act 2013 provides the definition of CSR as

"Every Company having a net worth of rupees five hundred crores, or turnover of rupees one thousand crore or more or a net profit of rupees five crore or more during the immediate preceding financial year shall constitute a Corporate Social Responsibility Committee of the board consisting of three or more directors, out of which at least one director shall be an independent director".

Explanation: For the purpose of this section, "average net profit" shall be calculated in

accordance with the provisions of section 198. Thus, the applicability of CSR provisions to the companies if:

i. Net worth of Rs. 500 crores or more,
ii. Turnover of Rs. 1000 crore or more,
iii. Net profit of Rs. 5 crores or more.

Rule 2(1) of the Companies (Corporate Social Responsibility) Rules 2014 , CSR means and includes but is not limited to:

i. "Projects or programs relating to activities specified in Schedule VII of the Act.
ii. Projects or programs relating to activities undertaken by the Board in pursuance of the recommendation of the CSR committee of the Board as per the declared CSR policy of the Company subject to the condition that such policy will cover subjects enumerated in Schedule VII of the Act".

United Nations Industrial Development Organization defined CSR as

"Corporate Social Responsibility is a management concept whereby companies integrate social and environmental concerns in their business operations and interactions with their stakeholders. CSR is generally understood as being the way through which a company achieves a balance of economic, environmental and social imperative ("Triple-Bottom-Line Approach") while at the same time addressing expectations of shareholders and stakeholders" - UNIDO

3.1 Type of CSR:

Generally, these initiatives can be categorized into environmental sustainability initiatives, direct philanthropic giving, ethical business practice and economic responsibility:

1. Environmental Sustainability Initiatives: This initiative mainly focuses on limiting pollution and greenhouse gases. Polluter pay principles, case laws add
2. Direct Philanthropic Giving: Donating money or resources to charity for the organization or society at local, national, and international levels. Donations to the PM relief fund, CM relief funds etc.
3. Ethical Business Practices: Primarily focuses on providing fair business practices such as equal pay for equal work and fair-trade standards.
4. Economic Responsibility: Focus on the business's long-term growth and maintaining a balance between growth and sustainable practices. An example of economic responsibility is when a company modifies its manufacturing process by including recycled products.

3.2 Benefits of CSR:

Corporate Social Responsibility initiatives have many benefits not only for society but also for the environment. The benefits of CSR are as follows:

1) Improve the name and brand of the Company.
2) Contribution towards education, healthcare, employment, and women empowerment.
3) Contributes towards sustainable development.
4) Improve the public image of the Company.
5) Attract and retain investors and employees.
6) Economic development and improvement of backward areas by promoting small-scale

business and community services. Enhance local and regional developments.

7) Unaddressed social issues may be resolved through the intervention of CSR.

8) Contribute to fulfilling Sustainable Development Goals.

ISSUES AND CHALLENGES OF CSR INITIATIVES IN NORTH EAST:

Although companies are participating in CSR initiatives in the Northeast, they are less effective than in other states of India. Considering strictly from the CSR point of view, North East needs maximum effort from government and private entities for its growth. As per the report, North Eastern states received the least amount compared to other developed states of India. The various factors which influence the growth of CSR in the North East are as follows:
Firstly, there is a need for knowledge and participation by the public about CSR in the Northeast. By engaging with local communities, understanding their needs and priorities, and building relationships based on trust and mutual respect, companies can create meaningful and sustainable change in the region. By investing in education, healthcare, environmental conservation, and sustainable development, companies can help to address some of the most pressing issues facing the North East

Secondly, expert and trained organizations such as NGOs must boost CSR initiatives in North East. The lack of infrastructure in the North East makes it difficult for companies to implement CSR initiatives effectively. In many cases, companies may struggle to access remote or underdeveloped areas, making it harder to reach vulnerable populations or address pressing social issues.

Thirdly, companies participating in CSR initiatives must be more transparent to the public. The challenges and limitations to CSR practices in North East India are the lack of transparency and accountability in how CSR funds are allocated and spent. Without proper monitoring and evaluation mechanisms in place, there is a risk that these funds may not reach the intended beneficiaries or may not have the desired impact on local development.

Fourthly, skilled and well-trained staff are needed for the execution and management of CSR initiatives. Another significant challenge is the lack of infrastructure and resources in the region. North East India is characterized by rugged terrain, poor connectivity, and inadequate social services, making it difficult for companies to implement CSR projects effectively. Limited access to skilled manpower and technical expertise further hinders the successful execution of CSR initiatives as companies struggle to find the right partners to collaborate with.

Fifthly, there are geographical barriers from the rest of India. Additionally, cultural diversity and language barriers in North East India pose a challenge for companies looking to engage with local communities through their CSR programs. Understanding and respecting the customs, traditions, and values of the various ethnic groups in the region is crucial for the success of CSR initiatives. Moreover, the region, known for its rich biodiversity and diverse cultural heritage, is also plagued by insurgency, ethnic conflict, and underdevelopment. Companies operating in this region are often caught in a dilemma.

However, there is a tendency for some companies to engage in "greenwashing," where they use CSR initiatives as a marketing tool to improve their public image rather than genuinely contributing to social and environmental well-being. This can undermine the credibility of CSR practices and erode trust between companies and local communities.

SPATIAL DIFFERENCES OF CSR SPENDING IN NORTH EAST:

The data from the CSR website reveals that companies spend considerable amounts of CSR, and every year, this contribution is increasing. However, considering the spending of CSR amount of all states reveals that NE State gets lesser contribution compared to other developed states. These spatial differences create a massive difference in the state's growth rate. In the Financial Year 2020-2021, developed states like Delhi (713.58 Cr.), Maharashtra (3426.31 Cr), Gujarat (1443.62 Cr), and Karnataka (1265.05 Cr) received more than 1000 crore. On the side, North Easter states Assam (167.78 Cr.), Manipur (10.3 Cr), Meghalaya (12.24 Cr), Mizoram (97 Lakh), Nagaland (3.57 Cr.) and Tripura (9.29 Cr) received less than 200 Cr, which shows an enormous difference in CSR spending.

Another vital factor owing to which North Eastern states receive less CSR spending is due to the least number of companies, because of which NE states have to depend on other states to receive CSR spending. Maharashtra, Gujarat, Delhi, and Karnataka have more companies, so they have higher chances of receiving more CSR spending. Due to inequality in CSR spending in NE states, retreat the purposes of CSR initiatives. Awareness must be created among the companies to spend CSR where development lacks. The purpose of CSR can be achieved only by removing spatial inequality in CSR spending.

State	Amount Spent FY 2014-15	Amount Spent FY 2015-16	Amount Spent FY 2016-17	Amount Spent FY 2017-18	Amount Spent FY 2018-19	Amount Spent FY 2019-20	Amount Spent FY 2020-21
(INR Cr.)							
Andaman & Nicobar	0.29	0.55	0.63	0.73	0.82	1.29	2.86
Andhra Pradesh	414.28	1276.73	743.68	575.07	666.02	710.12	715.81
Arunachal Pradesh	11.05	1.48	24.05	11.91	24.56	18.02	10.58
Assam	134.78	158.97	256.92	211.33	210	285	167.78
Bihar	36.69	123.8	100.62	106.17	137.56	110.48	79.3
Chandigarh	1.77	5.34	21.96	20.51	11.46	15.58	13.19
Chhattisgarh	161.3	239.72	84.66	176.7	149.35	269.68	307.83
Dadra & Nagar Haveli	4.41	12.03	7.37	6.98	13.48	18.34	21.98
Daman And Diu	20.05	2.39	2.63	20.23	6.25	9.53	5.25
Delhi	237.44	455.17	460.25	579.37	750.76	829.5	713.58
Goa	27.11	28.15	36.25	53.77	46.77	43.91	41.78
Gujarat	313.41	547.94	865.3	967.97	1082.18	984.15	1443.62
Haryana	187.41	373.44	386.17	363.43	378.11	536.57	542.45
Himachal Pradesh	10.95	52.2	22.83	69.23	78.79	78.61	105.01
Jammu And Kashmir	38.48	107.8	42.65	50.77	36.44	25.27	35.47
Jharkhand	79.44	116.93	95.49	109.23	109.8	155.21	210.27
Karnataka	403.47	771.59	875.41	1145.42	1252.18	1448.08	1265.05
Kerala	68.23	145.03	133.82	219.73	354.78	298.56	286.52
Lakshadweep	0	0.3	0	2.27	0.39	0	0.01
Madhya Pradesh	141.85	171.58	161.11	163.92	243.55	215.33	354.5
Maharashtra	1445.92	2026.91	2414.8	2797.53	3147.67	3348.82	3426.31

Manipur	2.44	6.25	12.35	4.81	7.81	14.21	10.3
Meghalaya	3.53	5.59	9.75	11.18	16.54	17.65	12.46
Mizoram	1.03	1.07	0.08	1.28	0.11	0.25	0.97
Nagaland	1.11	0.95	0.53	1.81	2.12	5.1	3.57
New/ Not Mentioned	26.94	0	7.63	137.93	4.44	26.41	176.2
Odisha	252.18	618.69	325.89	504.22	697.88	716.81	567.63
Pan India	3995.7	4039.44	4567.46	5505.37	6429.81	9385.41	7684.81
Pan India (Other Centralised Funds)	624.61	910.74	787.22	799.18	1155.86	1789.15	3417.89
Pondicherry	2.02	6.37	7.43	6.09	9.15	11.32	11.97
Punjab	55.61	69.14	75.05	112.36	166.85	188.52	137.29
Rajasthan	299.76	483.99	353.22	443.35	595.49	734.12	657.86
Sikkim	1.19	1.45	6.71	7	5.87	10.99	15.16

Table 1: The above data show the CSR Contribution received by different states. Data collected from https://csr.gov.in/content/csr/global/master/home/ExploreCsrData/mis-reports/state-wise-report.html

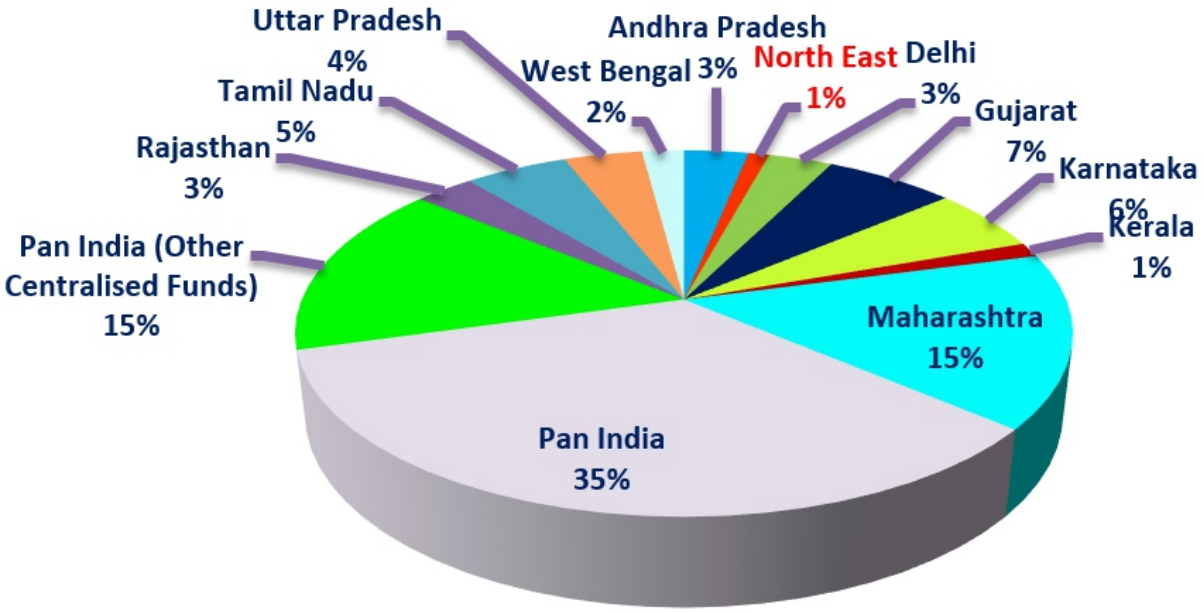

Fig 1: CSR Amount Spent FY 2020-2021 (INR Cr.)

Table 1 shows state and year-wise CSR spending, and fig 1 shows the percentage of CSR spending for the financial year 2020-21. After analyzing data as per Table 1 and Fig 1, it revealed that North Easter state received only 1% (very negligent amount) of CSR spending compared to other states. The data clearly shows there is spatial inequality in CSR spending. Moreover, as per the data of the CSR website, there is a spatial difference in CSR spending among the North Eastern states. Assam is receiving a more significant amount compared to other states of NE, but compared with other developed states, it is receiving a very negligent amount. In order to bring overall growth in the North Eastern region, spatial differences have to be removed; otherwise, this difference will build a massive gap in development between the North Eastern States.

AREAS WHERE SPECIAL INTERVENTION IS REQUIRED:

Global Himalayan Expedition (GHE) is a social enterprise that creates a life-changing experience for the traveller. Engage travellers and people in business to travel and empower the community through sustainable development and climate-positive travel. It has a local operation team working continuously on the ground level, and the result we witnessed in 2019 in more than 20 villages in Meghalaya has been electrified by them.

The northeastern region is gifted with natural resources, biodiversity, flora, fauna, spices, mountains, rain, forests, and rivers, which always attract travelers' attention. It has massive tourism potential. Tourism can be used as a tool for the eradication of poverty and the development of the region. People of this region are eager to learn; if any brand sponsors for the betterment of the region, it will not only gain name and fame but also access the natural resources and, by the uplifting skill of local people, can generate talent pool in NE.

North East receives less than 2% of the total CSR budget of India. Let us discuss some of the areas where special attention is required:

1. Connectivity system: Due to less favourable territory connectivity, it has become a challenge for the mobilization of resources. Poor connectivity is the main reason why corporate teams move away from the NE region. With more economic activity, infrastructure development can be improved.

2. Distance from Centre: Due to the distance from the centre, NE gets the least attention, and most funds go to the developed states of India.

3. Uplifting Skills of Local People: Due to a tough geographical location, it is challenging to implement implementing agencies in NE. If the locals are trained, they can be the right linking partner to bring the projects to the locality.

4. Healthcare infrastructure: Rural India depends upon primary healthcare centres for medical assistance. Particular focus is needed to prepare against the current and future pandemics.

5. In proportionate Contribution by Companies: The big companies registered outside the North East region having business in NE are contributing proportionately less to the NE state than their concerned state.

6. Digital Infrastructure for Education: NE states have the basic educational infrastructure, but the COVID-19 pandemic has made us realize the importance of digital education. So, if the Companies take the initiative to modify current infrastructure to digital infrastructure, this will help students and give companies access to a new talent pool.

7. Solar Microgrid: Most of the NE state suffers from an irregular electricity supply, so solar microgrids can be treated as an answer to the problem. Companies can incorporate this in their CSR initiatives—the best way to use renewable energy sources.

8. Market linking: NE region has a substantial small-scale handicraft industry, but they do not know how to promote this handicraft, so if they get a slight push from the corporate, they can be represented in the global market.

9. Tourism Industry: The NE region is genuinely gifted with natural resources. It will improve people's livelihood and promote experimental tourism as it produces tremendous fruit and spices.

CONCLUSION:

CSR is an evolving process, not an end; getting deeply rooted in today's business agenda, the active participation of corporate bodies in CSR initiatives can also achieve sustainable development goals. Few companies show a positive trend by spending more than the prescribed amount for CSR activities. To transform the theoretical concept into an actionable concept of CSR, corporations have to face many obstacles. The reason for spatial inequality in CSR spending will be more or less the same for all the states that receive less CSR contributions compared to developed states. Innovative solid strategies are required for the development of NE states. For successful CSR practice, the government should take the initiative so that the CSR process, project and distribution are equally available to underdeveloped states. By implementing effective CSR policies and distribution, companies can work towards creating a more sustainable and inclusive future for all.

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Obituary: Tribute to Pramod Prakash Shrivastav-jyu

Prof. Mahendra P. Lama

Senior Professor, School of International Studies, Jawaharlal Nehru University, Delhi
Presently Chief Economic Adviser to the Govt of Sikkim (Cabinet Minster Rank)

Formerly Prime Minister of India's Nominee in the Eminent Persons Group (EPG) on Nepal-India Relations (2016-2018) & Ex-Member, National Security Advisory Board, Government of

India Founding Vice Chancellor, Central University of Sikkim;
Formerly Pro Vice Chancellor, Indira Gandhi National Open University, Delhi

Mailing Address : 165 Uttarakhand, Jawaharlal Nehru University, New Delhi 110 067
Phones: 9818686637; E mail : mahendralama1961@gmail.com

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I am deeply saddened to hear about the demise of Pramod Prakash Shrivastav-jyu, a widely acclaimed civil servant, respected public intellectual and an extra ordinarily humane soul. Our prayers to all the mountain deities for the heavenly abode of his soul and deepest condolences to all the bereaved family members. We shall miss him for many years to come as he remained one of the strongest instruments to build peace and harmony and inject a sense of development direction in the entire North East region of India.

I have had very fond and rare opportunity to work with him on three strikingly far-reaching projects. The first was when he chaired the National Committee for the Revamping of North Eastern Council appointed by the Home Ministry in 2004, the second one, when both of us were members of the Steering Committee for the preparation of North East Region Vision 2020 appointed by the Ministry of Development of North East Region in 2006 and the third one when I was appointed as the Founding Vice Chancellor of the Central University of Sikkim in 2007.

We were always touched and impressed by his humility, simplicity and eruditeness and his openness to express so forthrightly yet softly and politely. While in the NEC Revamping Committee we had to visit a number of states and interact with varied stakeholders to discuss the critical issues. He would initiate the discussion and hand over the sessions to some of us. He had a very strong sense of history and institutional memories. When younger generation officers made some remarks based on incorrect facts and wrong perceptions, while many of us would be upset and angry, he would politely convince them to follow a different path.

In one of our dinner meetings, we started to discuss how NEC could be made more vibrant and effective institution, I suggested that it should be a regional planning body and counter part of National Planning Commission. I gave example of already existing Planning Bodies like Sikkim State Planning Commission (of which I had been a member) and argued that we needed an overarching agency like the NEC to plan, implement, monitor and evaluate the development projects at the regional level. He was deeply impressed and in the next day's meeting he forthrightly proposed the same. Naturally since he was proposing the acceptance was ready and universal. It was so heartening to note that PP Shrivastav-jyu was one of the first members of the revamped NEC in the rank of Minister of State.

Since the opening and making use of border crossing points with the neighbouring countries figured as a key development instrument both in terms of making our borderland commercially and economically beneficial and also engaging the neighbouring countries more elaborately, our discussion with the then Home Secretary was very engaging. As usual, he did not want to discuss these issues under the guise of security concerns as many of us knew that the state governments, private actors and civil societies wanted to interact more comprehensively with the neighbouring countries. He turned towards me and encouraged me to propose something which we had been discussing. I asked the Home Secretary, Sir till what point trade and commerce through India's land borders is a national security issue and at what point of traversing the borderland these issues become purely economic and commercial exchange issues. The Home Secretary was upset and preferred to remain quiet while PP Srivastav-jyu applauded my query as he himself headed the Home Ministry just few years back.

In the NER Vision 2020 document preparation, he would always say let's make it people's vision and not the vision of the government. As a result, there had been a massive consultation with the grass root geographies, communities and institutions. The then MDoNER Minister Shri Mani Shankar Aiyar who was also Minister of Panchayati Raj remained deeply impressed by this approach and gave us full support. The chemistry of two former civil servants really converged here. The Vision document was signed by all the eight Chief Ministers of the North East States and launched by Dr Manmohan Singh, the Prime Minister of India. Minister Aiyar and all of us in the Committee celebrated and jumped towards speedy realization of vision goals.

Since we were in the very inception of Sikkim University building project, I used to consult PP Srivastav-jyu very often. His presence made a huge difference as he always said that education is the first requisite for any meaningful development process and gains. Nothing forbade and stopped him from reaching Gangtok despite rugged terrains, poor road conditions and vagaries of monsoon and winter. He was just there in each and every consultation meeting and shared his experience with us and connected us with the national and global world. He was younger than the youths in his sprightly dressed presence and intellectual presentations.

What was very amazing was his deep understating about the pangs of newly born institution characterized by all kinds of negative pulls and adverse pressures from the Chief politician (while conversing with him I used to replace the term 3 chief by cheap that made him laugh like a child) and his henchmen and also some politically patronized institutions who found it difficult to grasp, assess and value the criticality of world class institution and significance of quality education. He appreciated my personal stand that institutions are much taller and broader than individuals, and hence the former must matter. We salute you Shrivastav-jyu for what you have contributed in building a modern, high quality and all-inclusive institution.

PP Shrivastav-jyu was brilliant in recalling some of the most crucial and touching anecdotes. They could have been collected as a core of the institutional memories and oral history of modern India. Alas ! some institutions would have done it.

For instance, once he told me that during the Sino-India war in 1962 he was posted in Bomdila

as a young officer. His major task was to provide relief of all kinds to the Indian soldiers. One day when he tried to check the bunkers of the Indian soldiers, he found that these bunkers were full with Chinese soldiers. He was frightened and taken aback. However, the Chinese soldiers were all asking for food with their folded hands and said they want to go back. Given the situation, he thought that it was not a good decision on the part of the Indian authority to surrender and withdraw. He said if we had resisted and sustained few more weeks, it would have been very difficult for the Chinese soldiers to withstand both hunger and frigid cold weather. Of course, I did remind him of the excruciating famine China was undergoing exactly during that period.

Kankhu Women Market Complex in Chandel District, Manipur: An NEC-funded project

The Donsang Hakhu (Community Hall)
A picture from an iconic NEC project:
Indigenous Habitat